FORESTS

OCTOBER 1941

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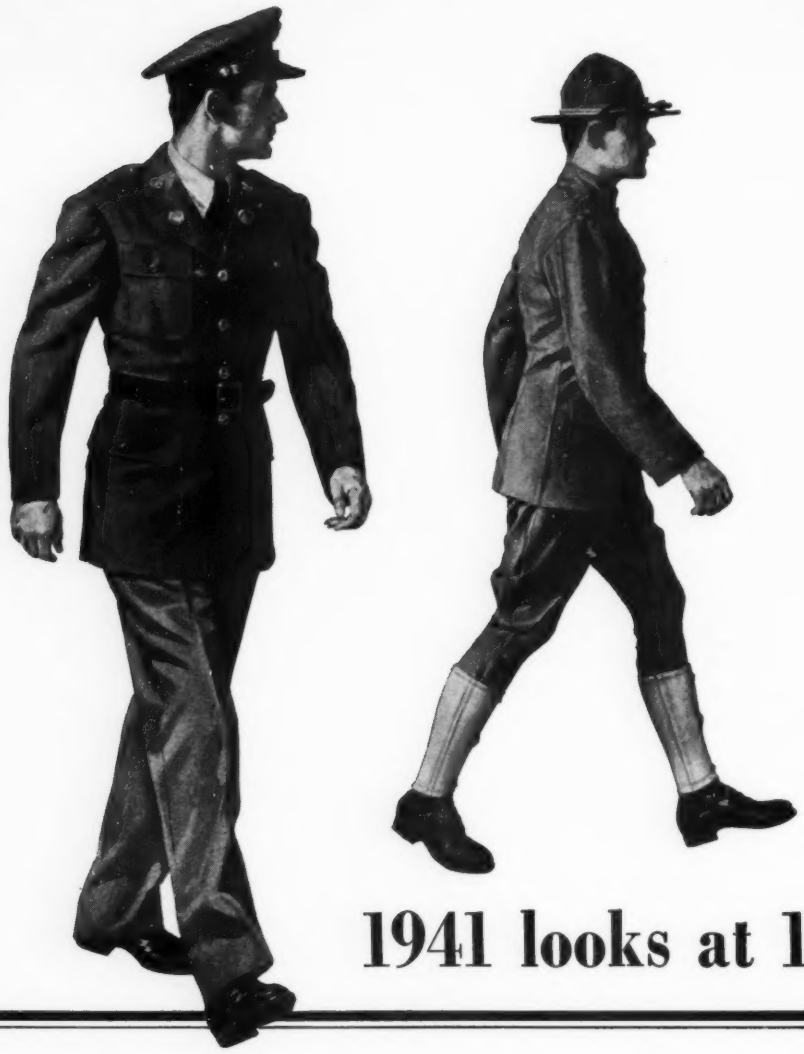

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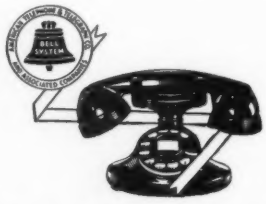

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AMERICAN FORESTS

EDITOR
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Lilian Cromelin
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Published monthly by

THE AMERICAN FORESTRY ASSOCIATION

919 Seventeenth Street
Washington, D. C.

The American Forestry Association is a citizens' organization for the advancement of intelligent management and use of the country's forests and related resources of soil, water, wildlife and outdoor recreation.

Its educational activities seek to bring about a better appreciation and handling of these resources, whether publicly or privately owned, that they may contribute in the highest degree to the welfare of the nation and its people.

In addition to publication of two magazines — AMERICAN FORESTS and CONSERVATION, both designed to keep before the people of the country important conservation questions and issues, the Association carries on educational projects in various fields including forest fire prevention, reforestation, protection of fish and wildlife, upstream flood control, prevention of soil erosion, preservation of wilderness areas, establishment of national forests and parks, development of forestry by private endeavor, the teaching of conservation in the schools of the country, promotion of research in timber growing and use and expansion of markets for forest products.

The Association is independent. It has no connection with any federal or state governments. It is non-political and non-commercial. All its resources and income are devoted to the advancement of conservation. It has been so operated since its founding in 1875. All citizens interested in forestry and conservation are eligible for membership.

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Entered as second-class matter at the Post-Office at Washington, D. C., under the Act of March 3, 1879. Acceptable for mailing at special rate of postage provided in Section 1103, Act of October 3, 1917, authorized July 10, 1918. Additional entry at Baltimore, Md., December 29, 1931.

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Who's Who

Among the Authors in this Issue

H. D. Crawford

HORACE DONALD CRAWFORD (*Canada's Forests Fight for Democracy*), freelance journalist from Indiana and Director of Journalism in Franklin College of that state, has been interested in forests since he was a small boy. In the summer of 1937 he travelled through Europe as a member of a journalism seminar and in the last three years has made seven trips to Canada, doing special articles on the increasingly important subject of Canadian-American relations.

Tom Hughes

TOM HUGHES (*Our Templed Hills*) of California, a maker of relief models—topographic miniatures—was born on a hilltop around which lay a panorama of blue mountains in the two Californias—American and Mexican. This, he says, may serve to explain his lifelong passion for far, high scenery. By the time he was twenty-one, he had climbed about every hill and peak he could dig his toes in. Loving the mountains, he loves to write about them and his published work has covered verse, nature and Indian lore, humorous fiction and even a history of the San Gorgonio pass. He lives and works in a lush California valley but, he says, his feet still love to carry him, betimes, into the regions above the world.

HARRY BOTSFORD (*The Little Quaker*), writer and outdoorsman, lover of hunting and fishing, lives near Titusville in the beautiful Pennsylvania mountains. Here he can watch deer feeding on his own property while he works at the job he loves best (next to fishing!)—writing about the creatures of the wildwood.

L. V. KLINE (*Tree Crops in the Tennessee Valley*), a native New Yorker, took his master's degree from the New York State College of Forestry in 1931. A senior Member of the Society of American Foresters and formerly a member of the faculty of Penn State, he was with the United States Forest Service three years before associating himself with the TVA, where he has been since 1935.

William Rush

WILLIAM M. RUSH (*Factors in Wildlife Populations*), writer and wildlife authority, is an old Forest Service man, formerly supervisor on the Lewis and Clark, Jefferson and Absaroka National Forests. A member of the Society of American Mammologists, his principal hobby is wildlife photography.

WILLIAM F. JACOBS (*A Pioneer Passes*) is Assistant State Forester of Florida. A Pennsylvanian, he took his master's degree in forestry from the University of Michigan and has spent the past seven years in educational work in forestry in Florida.

Francis L. Drag

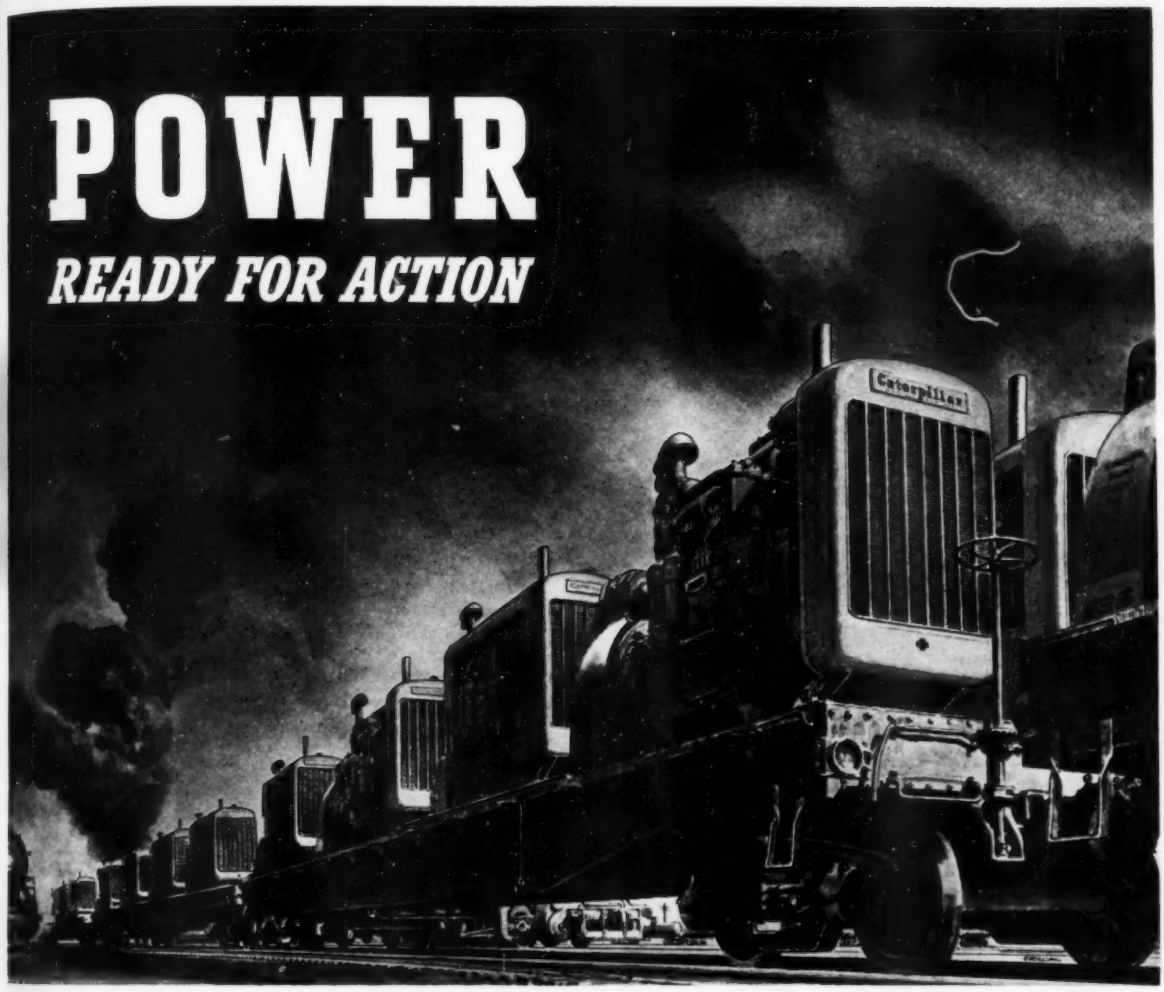
FRANCIS L. DRAG and RUSSELL W. BEESON (*A Teacher Workshop for Conservation*). Mr. Drag is an educator, active

R. W. Beeson

in the schools of California, where he has held a number of responsible positions. Formerly Director of Curriculum in the Modoc County Schools, he is now Assistant Chief in the Division of Elementary Education for the State. Mr. Beeson, on being graduated from the University of California in 1920, went into the Forest Service, specializing in grazing and range administrative work until 1930, when he became Supervisor of the Modoc National Forest. In April of this year he was assigned to the San Francisco office, in National Defense work.

THE COVER—"Ohio Oaks in October." Photograph by John Kabel.

POWER
READY FOR ACTION



WHEN this nation rolled up its sleeves for the gigantic task of defense, one of its first needs was *power*.

Camps, air fields, shipyards and munitions plants had to be built at full speed—many of them in remote places. Mines, quarries, oil wells and sawmills had to rush peak production of basic materials. And all these defense efforts depended on *power*. They had to have power in compact form—power that could be moved *anywhere* in a hurry—power that was ready to go to work and *stay* at work, regardless of geography or weather.

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BIG TREES

GIANT RED GUM

SOUTH CAROLINA'S CHALLENGER

The American Forestry Association is sponsoring a national hunt for the discovery and preservation of the largest specimens of the different species of typical American trees. Locate, measure and nominate your candidate in this competition. ACT NOW to make known and save the largest specimens of America's trees. For further details, send for the Association's special announcement of this Big Tree hunt. Mail your nomination with records and pictures to The American Forestry Association, 919 17th Street, Northwest, Washington, D. C.

THIS red gum—outclassing all others so far reported — has been nominated by Mr. H. A. Smith, State Forester of South Carolina, as the challenger in its class for that state.

The tree stands on the lands of the Hoffman Lumber Company at Columbia, S. C., and was called to Mr. Smith's attention by Virgil Miller, manager of the Company, and Mr. Stearns, of the National Defense Committee of the Southern Hardwood Association.

Measurements made by local officers of the United States Forest Service and the State Forester's office, with Mr. Clayter of the Hoffman Lumber Company, who visited and photographed the tree recently, show it to have a circumference of twenty-five feet six inches at breast height, and a diameter of six feet ten and a half inches. Its overall height from ground to tip,—as nearly as could be determined because of the dense foliage — is 200 feet; its clear length to the first important limb by Abney level is fifty-two feet. According to Doyle scale, the first three logs would have a total content of 8,766 board feet. Counting limbs and small logs in the top, the tree should scale 9,500 feet.

It is interesting to note that the tree stood on land formerly owned by Horace L. Tilghman, who for the first ten years of the life of the State Commission of Forestry of South Carolina was chairman of the Commission.

THE SUMMER of 1941 witnessed several interesting developments for The American Forestry Association's Trail Riders of the Wilderness. First, and despite the flame of war which is spreading over a good portion of the earth's surface, 136 men and women, a number exceeded only in 1940, enjoyed the multitudinous blessings of wilderness travel and wilderness living with these organized expeditions. Astride good horses, they made their way over a thousand miles of unfrequented trails in the rugged back country of six different states. And, abandoning chaps and spurs for the first time, they took to paddle and canoe to explore the magnificent lake wilderness country of the Superior National Forest in northern Minnesota.

Another interesting development was the recognition given the Trail Riders of the Wilderness by Wesley Winans Stout, editor of the Saturday Evening Post. Late in June, Mr. Stout requested permission to assign one of his ace photographers, Charles W. Herbert, to the Sawtooth Expedition in Idaho. This permission was granted and Mr. Herbert made a complete kodachrome record of the trip. A selection of his best pictures will be reproduced in the Saturday Evening Post.

Also, during the summer, Miss Marian Mair of Oneonta, New York, a physical education director, became the first to ride a thousand miles with the Trail Riders. Making her first trip in 1935, she has ridden with eight expeditions—in New Mexico, Wyoming, Idaho, Colorado, California and North Carolina. In addition, she was a member of the pioneer canoe party to explore the Minnesota lake wilderness in July. Trail Riders are exceedingly proud of Miss Mair's achievement.

Other champion Trail Riders are Mrs. Margaret Bruns of Long Island, New York, who has ridden 900 miles with seven expeditions; A. H. Hutchinson of Chicago, Miss Mary Downing of Kansas City, Missouri, and Miss Janet V. Lee of Evanston, Illinois, who have ridden 800 miles with six expeditions. Riding more than 600 miles with five expeditions are David Beals of Kansas City, Missouri, Miss Lillian M. Judd of Waterbury, Connecticut, Mrs. L. F. Gates of Wilmette, Illinois, Bruce S. Nichols of Santa Barbara, California, Edward M. Ruppe of Cleveland, Ohio, and Dr. William A. Shannon of Washington, D. C. Eleven riders have ridden with four expeditions, twenty-seven with three, seventy-five with two, and 411 with one. Altogether, a total of 538 men and women have become Trail Riders since 1933.

* * * * *

Every war like every cloud has its silver lining. For American conservation the silver lining to the present world war is the peace it seemingly has brought to the conservation agencies of the federal government. For many months now the Washington air has been free of the din and tautness of bureau and inter-department strife. No longer are representatives of different bureaus to be seen rushing here and there, bent upon maneuvers to defend and enlarge their bureau's place in the conservation sun. More men are in the forests, on the range and in the parks where there is work to be done; less are in Washington. A spirit of amicability and of "every man to his job" outwardly prevails. This is as it should be.

And being so, it seems timely to propose that the conservation agencies of the government here and now resolve to resolve their past differences and their bureau ambitions and to enter into a five-year armistice during which each agency will give its best and its all to its assigned field of public conservation service. Then at the end of the five year period let them appraise the tasks done and those larger ones ahead with the clearer, wiser and more kindly light that is sure to be in their eyes.

Ovid Butler

Editor.

Men, mighty trees and mountains—these have gone together through the history of the world. Forest-fringed mountains with snow-covered caps are frequent in the North American Rockies and Canada's forests play their part in the fight for democracy. Army camps and the British Empire Air Training Plan, concentrated in Canada, use vast amounts of lumber for necessary military construction

Canada's Forests Fight for Democracy

By

HORACE DONALD CRAWFORD

CANADA is swinging 783,000,000 acres of big sticks over the head of Adolf Hitler.

Dominion forests are bringing more American dollars into Canada for the purchase of United States war materials than any other commodity that Canada exports, including gold. Since Nazi invasion of European countries stopped their importation of forest products to Great Britain, Canada has supplied the major portion of these valuable necessities to the United Kingdom.

Canada's forests are fighting for democracy. They are supplying materials for army camps in Canada, Great Britain and the United States. They are building the ever-expanding British Commonwealth Air Training centers, whose wooden barracks and all-wood hangars the Duke of Kent, brother of King George VI,

Public Information Photo

Canada's lumber industry is providing the major supply to the United Kingdom since Nazi invasions cut off shipments of wood products from northern Europe. This freighter is loading with lumber at a West Coast port. British Columbia alone has produced more than one billion board feet of lumber,—an all-time record

Public Information Photo

Lumberjacks bring in the logs from the mighty Douglas fir forests of British Columbia. More than 500,000,000 board feet of lumber has been sent across Canada in recent months for East Coast shipment to Great Britain

flew to Canada to inspect. They are supplementing steel in the increased program of Canadian shipbuilding. They are supplying shipping crates for the ever-growing output of Canadian munitions plants and other war industries. They are helping Canadian workmen build airplanes.

You find in the Dominion's wartime forest story more than the crash of falling trees, more than the metallic scream of whirling saws, more than the perpetual pounding of the builder's hammer. You see red-blooded lumberjacks sweating on the side of liberty-loving peoples. You observe enthusiastic mill workers toiling for the perpetuation of freedom and the rights of individual men in democracies. And every time they chop a notch in a tree or drive a wedge in a log, you see another "V" for victory.

Canada's timber empire is divided into two parts, Allan S. Nicholson, Timber Controller of Canada, told me as we discussed the vital role of forest products in a mechanized war. "We have the western coastal area where a few hundred men operate the lumber industry," he explained, "and the vast expanse between the Rockies and the Atlantic where thousands of men administer lumbering activities."

Scientifically, the forests of Canada are divided into eight regions, determined largely by climate and geography. Foresters designate these as the Boreal, Subalpine, Montane, Coast, Columbia, Great Lakes-St. Lawrence, Deciduous and Acadian. Each region is subdivided into sections.

The Boreal Region is by far the largest. It extends from Quebec's Atlantic waterfront to Alaska. Some of it reaches to the Aretic Ocean, at the Mackenzie Delta. Another strip tips the Gaspe Peninsula at the mouth of the St. Lawrence. This region is primarily coniferous, resembling the forests of Northern Asia and Europe.

Subalpine forests in Canada occupy upper slopes of mountains, descending to the 2,000 or 3,000-foot level, and are mainly in the Canadian Rockies. The Montane Region consists of western interior valleys and ranges where rain is scarce, temperatures moderately high and the climate dry. Naturally, the Coast forests extend along the Pacific. Rainfall is excessive, temperatures soar relatively high, and tree growth is luxuriant.

The Columbia region follows main valleys of the Columbia River and its tributaries. Western white pine and larch predominate, mixed with Douglas fir, grand fir, red cedar and hemlock. The Great Lakes-St. Lawrence Region surrounds that sinewy, five-fingered arm of potential seaway that reaches from the Atlantic and gives the heart of North America the finest fresh water lake system in the world. Climatic conditions vary; so do the forest species. You find intruding here various characteristics of other forest regions.

The Deciduous Region is a small northern thrust of the vast deciduous area that covers most of the eastern half of the United States. It stretches across southwestern Ontario, where Canada extends southward on parallels with Michigan. Canada's Acadian forests dot Maritime Province islands and peninsulas jutting into the Atlantic south of the Gulf of St. Lawrence. The area then follows the Appalachian ranges into the United States.

You find over these eight forest regions more than 160 species of trees. Canadian foresters refer to them broadly as "softwoods" and "hardwoods." Valuable commercial uses have been found for twenty-three species of the softwoods, which are conifers, while thirty-two species of the broad-leaved hardwoods have been exploited for domestic and industrial purposes.

Forests in Canada spread over 783,000,000 acres, approximately thirty-five per cent of the Dominion's total land area. About 493,000,000 acres are accessible and regarded as able to produce continuous timber crops. The other 290,000,000 acres are in sub-Arctic, mountainous, or other unfavorable areas where existing transportation facilities do not reach and commercial lumbering would be prohibitively expensive. Timber large enough for commercial purposes now covers forty-seven per cent of the accessible area, while the other fifty-three per cent has young growth on its way to future commercial uses.

You should remember when thinking of Canada's forests and their vitally important role in the present war that the Dominion is the largest nation in the Western Hemisphere. Its land area covers 3,466,556 square miles, compared to Brazil's 3,275,510 square miles and the 3,026,789 square miles of continental United States.

Penetration of Northern Europe by Hitler's mechanized units cut off timber shipments from that source to Great Britain. Canada arose to the emergency. H. R. MacMillan was named Timber Controller of Canada shortly before the fall of France, and on July 19, 1940, he called a meeting at Ottawa to organize the National Lumber Advisory Committee.

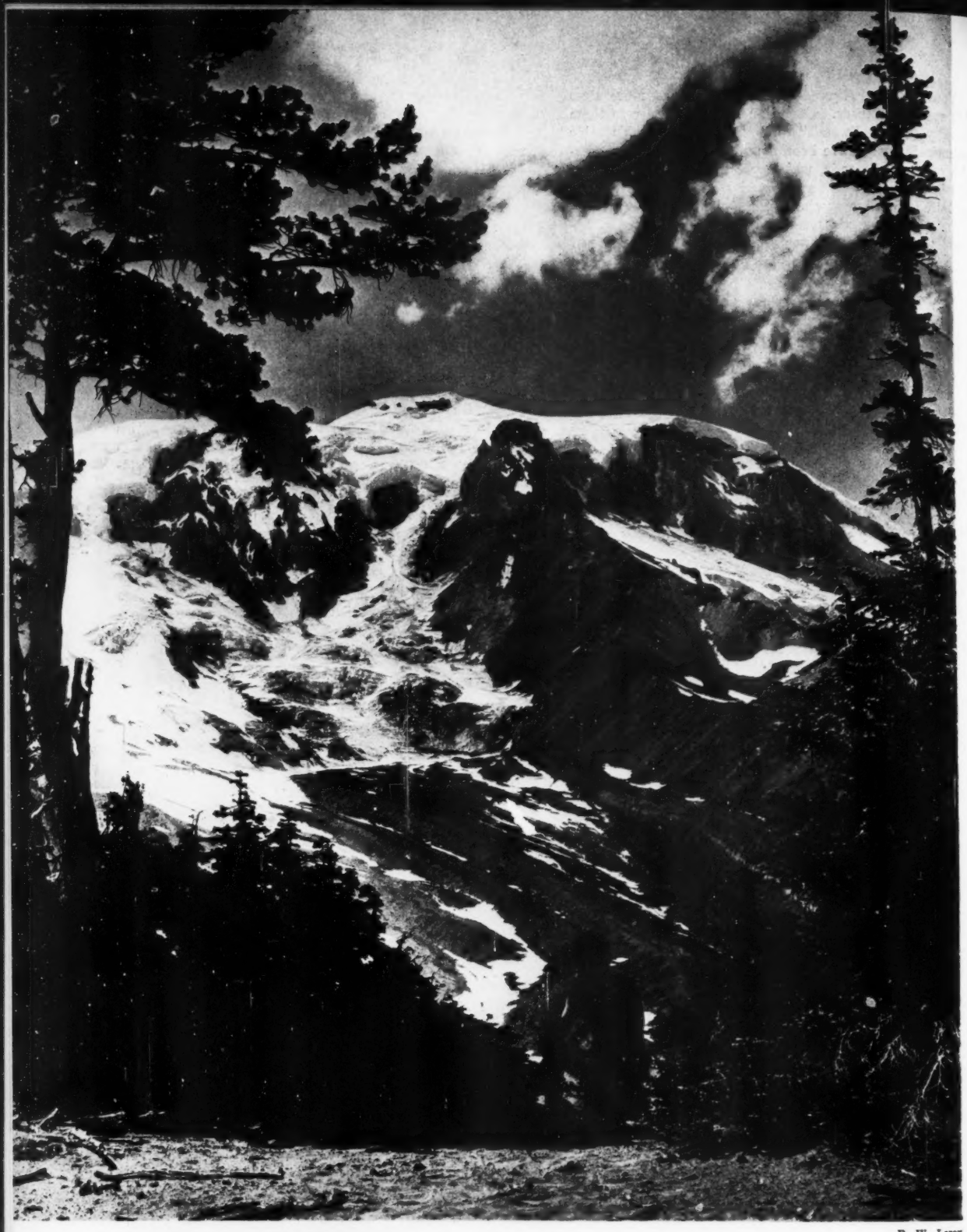
Canada's wartime timber policies were formulated at that organization meeting. Several months later, Mr. MacMillan was named chairman of the important War-time Requirements Board, and Loren L. Brown was appointed timber controller. A short time later, Mr. Brown resigned to resume his duties as vice-president and director of a Montreal chemical industry. Then, on June 17, 1941, Allan S. Nicholson was named timber controller. Timber policies, however, have remained fundamentally the same as originally laid out by Mr. MacMillan.

Europe's situation, Mr. MacMillan emphasized, was unprecedented. Canada was almost the only remaining source of timber supply for the United Kingdom. Portugal, alone in all Europe, was making shipments to England, and that supply might at any time be stopped. Napoleon's blockade had cut off all continental supplies from Britain, it was remembered, and that situation more than a century ago had greatly developed Canada's timber industry. Britain's policy in the present war, Mr. MacMillan explained, was to conserve United States currency for munitions and purchase timber from Canada.

Canada's lumber industry, therefore, was expected to spurt to meet the emergency. Britain's demands must be met. In addition, the rising demands for Canada's own war activities required increased amounts of timber. Furthermore, civilian requirements must not be neglected. (*Continuing on page* 483)

Public Information Photo

Lumbermen's axes swing on Rocky Mountain slopes and the valuable timber products pour to the mills from Canada's vast forests. This lumber is piled on the docks of a British Columbia port, awaiting shipment to Britain. Even the chain on the loading hook forms a "V"—the Empire's symbol of victory



B. W. Leroy

Mount Adams, in Washington,—remote, beauteous,—a high sanctuary

"Each cloud-capped mountain is a
holy altar."—Hood

Our "Templed Hills"

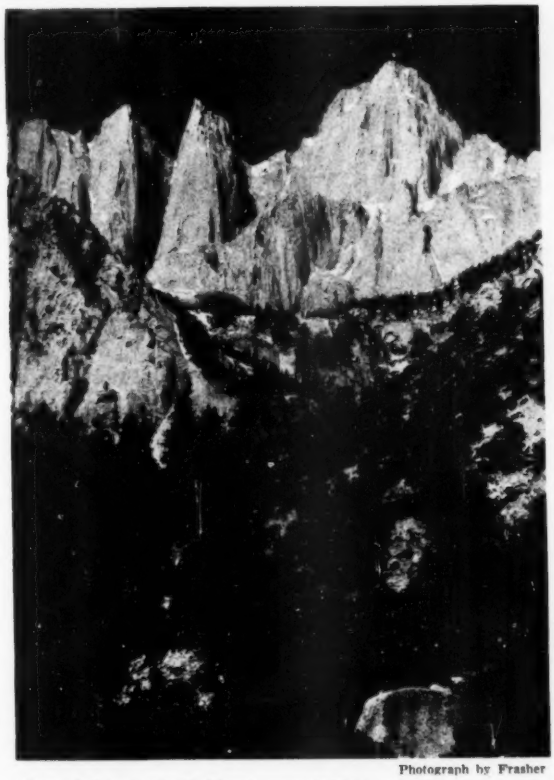
By TOM HUGHES

WHO KNOWS A MOUNTAIN?

Who knows a mountain?
One who has gone
To worship its beauty
In the dawn;
One who has slept
On its breast at night;
One who has measured
His strength to its height;

One who has followed
Its longest trail,
And laughed in the face
Of its fiercest gale;
One who has scaled its peaks,
And has trod
Its cloud-swept summits
Alone with God.

—*by* ETHEL ROMIG FULLER,
from "White Peaks and Green."



Photograph by Frasher

Mount Whitney, in California—our loftiest summit . . . the monarch of mountains

"They crowned him long ago,
On a throne of rocks, in a robe of cloud,
With a diadem of snow."—Byron

WE OUGHT to know our mountains better, for they stand among the foremost of America's natural blessings. Without their gifts of climate, their bounteous rivers, their unsparing vaults of treasure, the United States could not have become the nation it is today.

Then there is such an inspiring host of them: bold ones and gentle ones, the granite-tossed and the flower-clad, set here in lofty clusters, there in stately files, now in sweeping arcs, again in solitary grandeur, and arrayed in all the colors under heaven. It would be strange if the American were not a mountain lover at heart.

But once we try to measure a mountain with the eye we shall find out it has a serene way of confounding us. And as we stand at the foot of it, looking up, we shall learn that even its mathematically determined altitude above sea level matters little, for we are taking our peak as it is. We have to appraise it in terms of sheer rise from its visible base to its summit.

Our common-sense eyesight compels us to choose as a base that unmarked yet rather definite point where the ground begins to rise with mountain-like steepness. If we do not set this reasonable base for our peak, some meandering skyline will surely lure us into a far country. We might, for example, trace the descending sides of Mt. Rainier for mile after mile until our vision should be lost in the wooded lowlands toward the coast; or starting from the pinnacle of Telescope Peak our eye might wander down and down in an ever-lessening curve to the sink that is Death Valley.

Taking off, then, where foothill and mountain meet, we are due for two surprises. The first will come when we find fewer than two score distinct peaks rising as much as a mile above their foundations, with a fourth of these clustered in one of our national parks. A greater surprise will be to learn that the Rocky Mountains contain none of our gigantic peaks. This sounds like *lese majeste*,—so we must point out at once that the good reason for a dearth of first magnitude mountains in the United States Rockies is the skyward reach of the system's base. Where we glimpse countless valleys and lakes that lie among the clouds there is but mild glory for an eminence that soars, however resolutely, a bare two or three or four thousand feet higher. Some of these summits, visible far and wide, are seen in a close-up to be little more than super-hills, so to speak.

Mount Rainier—pure with new fallen snow, at the birth of day Devereux Butcher

"In the morning of the world,
When earth was nigher heaven than now."—Byron

Such are the renowned Grays Peak and its twin, Torreys Peak, dwelling in silent fellowship nearly three miles above the tides. The Indians dubbed them "The Ant Hills." And Uncompahgre Peak, among our dozen loftiest, scarcely startles with its scant 2,000 feet of final thrust.

Let us pause before the indescribably wild Grenadier Range, in San Juan County, southwestern Colorado, with its galaxy of 13,000-foot summits gleaming afar from their setting in a frosted crescent. This "Home of the Storms" makes an earthly panorama sublime to a degree, still there is not a big peak in sight. Nestled in one of the wild spots, however, there is a tiny lake that lies higher than the heralded Titicaca of the Andes.

From Indian Pass to Downs Mountain, the higher east slope of Wyoming's Wind River Range, is virtually one vast sheet of ice, although we should find no peak with as much as 4,000 feet of sheer ascent. And there is San Francisco Peak, in north-central Arizona. The claim has been made that from its summit on a clear day a person with a good glass can look into six states and a foreign country; yet if set down in a valley amid real giants of peaks it would not be heralded beyond its own township. Its main slopes are no steeper than those of Mt. Washington, in New Hampshire, a modest peak which never has aspired to a place among the immortals.

If it were fitting to psychoanalyze mountains we could call this kind the subjective sort, meaning one which, although providing ever so grand a viewpoint, does not, like the objective peak, afford a spectacle to be marveled at and talked about. Many of our state's-pride mountains fall in this subjective class. Truchas in New Mexico, Granite in Montana, Gilbert in Utah, Boundary in Nevada, Borah in Idaho, Fremont in Wyoming, Marcy in New York, Mitchell in North Carolina, are fair examples.

Mt. Elbert, loftiest point in Colorado and second loftiest in the United States, although a commanding summit, rises less than a mile above its foothill base. The same is true of its cliffy neighbor, Mt. Massive, which stands like some benevolent deity above the City of Leadville. Pikes Peak, perhaps the best known mountain in North America, sits high and displays an impressive profile, yet its dimensions are not remarkable in any respect.

Before we take leave of our super-hills we must note one in the San Bernardino Range of Southern California, so hugely overgrown that it shames many a spectacular peak we have heard much about. In every respect, save that of elevation, Mt. San Jacinto is a veritable hill: and more than one Palm Springs tourist has voiced a doubt that the bald, picture-book knoll at the summit is higher than two miles above him.

Colorado's Mt. Harvard, Longs Peak, Blanca Peak, each with more than a mile of steepness, together with the dizzying Maroon Peaks and the Crestones and some isolated masses that have not been accurately triangulated, redeem the Rockies somewhat; but in our quest for titanic silhouettes we shall have to seek out some other mountain system.

There is a promising one, towering against the sunset. Already lofty enough to challenge all but the tallest of the Rockies, it has been thrust of late farther into the sky, until today it quite astounds us with its vistas of height and depth. In the Sierra Nevada, with its offshoot ranges, we find these vistas, not only among its individual peaks but also in profusion along its unbroken chains. The main divide from Owens Peak northward to Mt. Dana, a distance of some 200 miles, consists of parallel, converging, and diverging crests that often attain more than a mile above their lateral north-and-south valleys. Thirteen-thousand-foot summits are well-nigh countless along the divide and on both sides of it, some of them glaciated. There are a dozen 14,000-footers in this "Big Snowy Range." Mts. Whitney, Williamson, and Langley are true giants, each with more than 8,000 feet of stature on at least one exposure.

Mt. Whitney, top of the United States, is very much a cliff. It is buttressed north and south by shoulders which accentuate its eastward-facing wall. This 1500-foot parapet is a fitting design to set off our loftiest summit.

Eighty miles to the north, White Mountain Peak, lording it over the White Mountains, grows still higher above its humble beginnings in Owens Valley, but because of the bulk of its flanking ranges it is not strikingly preeminent.

The Inyo Range, across Owens Valley from Mt. Whitney, is probably the greatest rock wall in North America. For thirty miles it heaves an almost solid front 6,000 to 9,000 feet above Saline Valley. An unnamed crest in this range marks one of the very tallest of our monuments. This summit exceeds White Mountain Peak in sheerness, standing 9,800 feet above the valley floor, less than six miles away. Another point hereabout looks down from a height of 7,700 feet at three miles. These are enormous configurations, indeed.

Smaller in extent than the Inyos, and less steep, the Sierra Madre, back of Los Angeles, is nevertheless one of our outstanding mountain clusters, with its San Antonio Peak rising 9,000 feet above the close-lying orange groves. Much the same lofty outlook is had by San Bernardino Peak, a near neighbor. Another imposing single range is the Wassuk, in western Nevada, whose culminating point is lifted 7,200 feet over Walker Lake.

The gaunt Panamints boast their Telescope Peak. The apex of this pyramid, whose striking symmetry is all but wasted on the desert air, looks down from its 11,000 feet into the tawny emptiness that is Death Valley. In wide-sweeping, unbroken elevation above contiguous terrain it may be beaten only by San Gorgonio, the overgrown hill mentioned, which soars still higher above its distant roots in Coachella Valley. In going so far afield, however, we have abandoned the definite slope limits we set at the beginning. Retracing our steps to the foothill line we find that majestic Telescope will have to be satisfied with second place among our great sheer masses.

Properly humbled, we approach Mt. San Jacinto, across the Mojave Desert to the south. Springing sharply — so sharply, indeed, that the desert hiker might literally stub his toe against its side — springing thus from near the ancient beach line of the Gulf of California, the total rise of this Cyclopean mound is just under two miles. Its fluted and pinnacled north precipice falls away 7,000 feet, presenting the most spectacular mountainside in our country. The Inyo scarp, while much longer and in places even higher and almost as steep, is far less impressive, since its sheerest part is at the foot, with the upper regions dwarfed accordingly, while San Jacinto's scarp becomes so precipitous toward the crest that its cornice sometimes appears to be toppling over upon the spectator. Telescope Peak offers no such awesome features.

The hugeness of this sheared-off and gouged-out moun-

The Teton Range, in Wyoming. Shadowy, gloriously beautiful, the Tetons rise beyond Jackson Lake

"'Tis distance lends enchantment to the view,
And robes the mountain in its azure hue."—Campbell

Forest Service

tainside may be suggested by a few comparisons. No equally steep cliff in the Grand Canyon is more than half as high. Yosemite's Half Dome would hardly reach its middle, while El Capitan, if set into the face of the scarp, would scarcely hide its general profile. Pikes Peak, heaved over the brink, would go tumbling down into the cirque-like bowl. The tourist who, from The Narrows in St. Mary Lake, Glacier Park, has gazed aloft to Red Eagle Mountain on his left, and to Going-to-the-Sun Mountain, dead ahead, is assured that if the one were piled bodily upon the other the two of them could be tucked under the lee of San Jacinto's granite wall.

And down the face of this wall a brook hurtles. A brook so steep that much of its silvered flight lies in perpetual shadow. This Snow Creek has been called the most torrential stream in America.

In a burst of patriotic ardor, San Jacinto's north facade was once described as the highest stone wall in America, but it does not in truth take that coveted place, being outclassed, and right handsomely, by Mt. Robson, in the Canadian Rockies, which in turn is quite eclipsed by the unbelievable shoulders of the Yukon's Mt. Logan.

All that region where the Sierra Nevada break down at their southern end is a land of amazing steeps. The mountains here spring from near sea level and wear crowns of snow a good part of the year. Were the least of them seated on a suitable throne amid the Colorado Rockies it would command the homage of nature lovers the world over.

The Grand Teton, of the Jackson Hole country in northwestern Wyoming, merits patriotic attention, seeing that its four pinnacles give us our most rugged bit of United States skyline, with the north pinnacle affording perhaps our third steepest mile. Mt. Moran, sister peak of the Grand Teton, while not very tall is so consistently steep on all her sides that she stood unmastered after most of our other peaks had been humbled by the heel of man.

Utah boasts six peaks of the first magnitude, standing almost in line along the Wasatch escarpment. Southward from Ogden sections of this range lift their cameo crests more than a mile above the plateau floor, and the summits along the escarpment are so many mighty promontories jutting into a sunset ocean.

It is in Glacier National Park, Montana, that we find the largest family of distinctive peaks dwelling together. Fairly tall are they, and exceedingly steep. A few are so steep that glaciers seem to have been unable to keep a foothold on their sides. Ten of them tower more than a mile above their near-by valleys and lakes.

We may not ignore Yosemite Valley, even though it can boast no major peaks, for it does offer the steepest

The Wind River Mountains, in Wyoming

"He who ascends to mountain-tops shall find
The loftiest peaks most wrapped in clouds and snow—
He who surpasses or subdues mankind,
Must look down on the hate of those below."—Byron

Milton C. White

Devereux Butcher

The Presidential Range, in the beautiful White Mountains of New Hampshire

". . . . . where Nature's heart
Beats strong amid the hills."—Milnes

mile in our country. The crest of Half Dome stands 4,800 feet above little Mirror Lake, 3,500 feet off from a plumb line. We can form a fair picture of this monument if we imagine Pikes Peak with its Manitou face sliced off almost vertically. Whatever of merit lies in California's claim to being the Switzerland of America, surely this Half Dome of hers may contend for honors as America's Matterhorn.

Looking now at the volcanic cones of the northwest, we note that each one of our "Big Six" stands quite alone, and rises out of relatively low country. Had one of them been upraised in the Leadville district it would give Mt. McKinley a race for North American supremacy. These glacier-clad solitaires are the only large mountains we have which are not more or less one-sided. Pikes Peak, for instance, would scarcely be recognized from its insignificant rear, and San Jacinto is conquered from its southwest slope by riders on horseback. Longs Peak is one that is quite upstanding from all points in its perimeter.

Mt. Shasta has suffered two humiliations in recent years. As if it were not enough that the official mountain measurers should lop off some 200 feet from her cherished elevation, a profane drizzle once melted part of her lovely snowcap and made mud spots upon her brow. Yet she is a grand mountain, towering in the drapery of her glaciers more than a mile and a half above the darkling ranges.

Whoever has come suddenly upon the view of Mt. St. Helens in winter dress has not forgotten the sight. Marvelously like a huge cone of ice cream, it stands aloof, shining above the black of the forests. In outline, if not in bulk, it is one of our notable monuments.

Mt. Hood holds an elusive aura that seems to conceal its truly huge stature, in which respect it stands among our ten greatest mountains. Some connoisseurs have been moved to call it the most beautiful of all our masses. Of the glaciated mountains it is perhaps the easiest to climb, being manageable in a few hours.

Mt. Adams' unsymmetrical profile might seem to suggest a lurking inferiority complex; yet the mountain has nothing to be ashamed of, and is a triumvir worthy to rule alongside its coreigning monarchs, St. Helens and Rainier.

Mt. Baker, looming white in our extreme northwest corner, is not as lofty as some of its volcanic neighbors, but like San Jacinto it stands proudly on its own feet, and turns one of the noblest of mountain faces toward the nation that lies spread so far below it.

"The White Heap: Home of the Great Spirit." Inevitably, there can be but one of these; and wherever we may take our stand in central Washington the majesty of this mountain will enthrall us. So massive that it quite dwarfs its supporting ranges, themselves a mile high, Mt. Rainier strikes the distant worshipper as rearing its full stature out of a level world. Often in the

moist air of the Washington woods its white crown seems to hang in the sky. The immensity of the massif belies its steepness not less than its height. Willis Wall, although one of our first precipices, is barely distinguishable on the north slope, while several of the mountain's twenty-eight glaciers drop more than 10,000 feet ere they melt away. Their area about equals the combined glacial spread on all the neighboring cones of the Northwest. Our previous foothill-to-summit restriction is certain to be spurned by those persons who have looked upon Rainier's glory from afar.

Should we care to pick our six tallest peaks in close-up, with an eye to eliminating shoulders, spurs, foothills, and other belittling approaches, their order will be about thus: San Jacinto, Telescope, Inyo Summit, Baker, Rainier, White Mountain. In a distant viewing, taking thought only of their country-wide dominance, the order might be: Rainier, Shasta, Baker, Adams, Hood, St. Helens. The Big Six! It is not likely that a connoisseur would think of dethroning any of them, although he might rearrange the list.

Some of the factors that determine a mountain's distance appeal are shape, setting, snow line, glacier placements, and even more especially, the condition of the atmosphere and the sun's position at time of observation. Favored by many circumstances, chief of which are a lofty setting, a balancing of snow masses, a certain dignity of skyline, a sudden bursting upon the expectant eye of the traveler, the whole tinted with the romance of covered-wagon days, Pikes Peak wears a halo that is out of proportion to its physical merits; while White Mountain Peak, a greater mass in every material respect, but standing back from the trails of men, goes unhonored and unsung.

In the matter of impressive ranges, any enthusiast's list would include, besides the High Sierra, the Wasatch in Utah; Teton and Wind River in Wyoming; Park, Sawatch, Sangre de Cristo, and Needle in Colorado; Sangre de Cristo in New Mexico; Inyo, White, and Panamint in California; Olympic in Washington.

What a range is that Wasatch, with its classic harmony of proportion, a stature undwarfed by foothills, slopes rugged without oppressive sheerness, an ascending rhythm of spur and shoulder, peaks resolute and clean of line, snow masses trailing in filigree down the shadowy sides, far-off glistening fields that seem never to have known a springtime, and a skyline that appeases the divine hunger in a mountain lover's breast.

Now as to which of our mountain masses is the most beautiful — there could be as many opinions as there are mountains. Although quite outdone in magnitude by the giants of the West, our eastern peaks are not easily to be surpassed in charm. The White Mountains and the Blue Ridge and the Adirondacks seldom startle, still their summits display a nobility of line that may live in the memory long after many a brazen peak has been forgotten. And even in these regions of subdued and softened topography we do find an occasional spot that still bears a scar from some mighty earth-battle of old. From Lower Ausable Lake in the Adirondacks we look

The Smokies, in Tennessee. Towering peaks, magnets for swiftly moving clouds

"Night's candles are burnt out, and jocund day
Stands tiptoe on the misty mountain tops."—Shakespeare

James E. Thompson

Bert Huntoon

Mount Baker, in Washington

"From every mountainside
Let Freedom ring."—Smith

up to precipices that compare with some of the renowned scarps of the lusty young western ranges.

For those qualities in a mountain that take one's breath, we may single out Telescope and the Inyo Summit and San Jacinto, these three; but the greatest of these is San Jacinto. Taller than that famed structure in the Swiss Alps, if not so sheer, it qualifies as the nation's Wetterhorn, even as Half Dome might well pose as our Matterhorn, Shasta as our Blanc, Hood as our Jungfrau, and Telescope as our Fujiyama. But Rainier — the Snow Queen — "Tahoma, the White Pile where the Great Spirit Dwells" — in the very nature of things is comparable to nothing else betwixt timberline and the sky.

NOTABLE PEAKS

Extreme base-to-summit risings, eliminating foothill or talus slopes of less than 15 per cent.

		Tallness	Alt. above sea
Arizona	Humphreys Peak	5,000	12,611
California	San Jacinto Peak	10,300	10,831
	Telescope Peak	10,000	11,045
	Inyo Summit	9,800	11,125
	White Mountain Peak	9,100	14,242
	Mt. Shasta	8,700	14,161
	Mt. Whitney	8,100	14,495
	San Gorgonio Peak	7,200	11,485
	Half Dome	4,800	8,852
Colorado	Longs Peak	5,800	14,255
	Blanca Peak	5,400	14,363
	Pikes Peak	5,000	14,109
	Mt. Elbert	4,500	14,431
	Torreys Peak	3,200	14,264
Montana	Mt. Stimson	6,100	10,155
	Mt. Cleveland	6,000	10,438
New Hampshire	Mt. Adams	4,300	5,805
	Mt. Washington	3,600	6,290
New York	Mt. Marcy	2,000	5,344
North Carolina	Mt. Mitchell	3,500	6,711
Oregon	Mt. Hood	7,700	11,253
Utah	Mt. Timpanogos	7,200	12,000
	Mt. Nebo	6,800	11,880
Washington	Mt. Baker	9,500	10,827
	Mt. Rainier	9,100	14,408
	Mt. Adams	7,800	12,307
	Mt. St. Helens	6,700	9,671
Wyoming	Grand Teton	6,700	13,747
	Fremont Peak	3,100	13,730

The Little Quaker, on her nest,—shyest of game birds—blends perfectly in her unobtrusive brown with the October landscape

THE LITTLE QUAKER

By HARRY BOTSFORD

Photographs by the Fish and Wildlife Service

BELOW us stretched Indian Run, a wavering silver thread through the crisp October landscape, brave with scarlet and gold and sombre browns. The Old Timer and I were content; we lolled comfortably in the golden sun of high noon, our backs against an old stake-and-rider fence. O'Leary, the old and wise Irish setter, stretched on his side and snored, unashamed. He, too, isn't as young as he was once. There had been a very generous nip of amber rye from the battered silver flask of the Old Timer and some suitable sandwiches. The morning had been a profitable one. I had bagged a brace of prime woodcock and the Old Timer, thanks to some very superlative shooting, had dropped three birds. He was inclined to be philosophical over his pipe.

His brief grey beard wagged solemnly. "Near as I can make out," he opined, "God first probably made all the birds on land and sea. He was right happy about the job but when He looked around He found there was considerable material left over. He was a tidy and a thrifty Deity so He decided he should use up these odds and ends. A lot of it just didn't seem to fit. There was a long bill, some sober brown feathers and a pair of feet that couldn't perch anywhere but on the ground. Even the qualities and senses were pretty scrambled: a sense of hearing almost supernatural, shyness equivalent to the humming bird, dignity and a sense of innate modesty. Not much to go on, to be sure, but God can work miracles and He did a first rate job when he assembled these odds and ends together and breathed life into them. Search as He would, He couldn't find any song left; but He has a sense of humor, a thing most of our clerics have unfortunately overlooked. So, instead of putting a song in the throat of the bird, He cunningly put it in the wing feathers and ordained that at a certain speed, when the bird changed direction of flight, the feathers would give off a special sort of whistle. He looked on His work and found it good. We call that bird woodcock. That's my idea of how it all happened."

After ten years of hunting with the Old Timer I am inclined to accept his statements, even when they diverge into the mysterious realm of theology, at face value. Possibly O'Leary dissented, for he opened a brown eye and gave a solitary flop of his tail.

The woodcock is a bird apart. He isn't a true snipe, to be sure. I call him the Little Quaker, for he is, male and female, a sober and unobtrusive brown that blends perfectly with October foliage. He minds his own business; he is peaceful and gentle and self-supporting. He is plump. She is plumper. So far as I know, it is the only species of bird where the female is larger than the male. Maybe his shyness is due to an inferiority complex because of this but I have always understood that the family life of woodcocks is sunny and unmarked by family differences.

Of all game birds, I suspect the woodcock is the least known. Yet, where he exists, he is held in high affection by both gunners and trenchermen. Thirty years ago my father introduced me to the Little Quaker. Since that time I have grown, too, to love this small, plump, furtive game bird. He represents ideal wing shooting; he is normally found in fairly open cover and

his flights are of short duration. He makes a most deceptive target. Just as your sights cross his field of flight, he suddenly changes direction and there is a haunting whistle that mocks you and sandpapers your temper after your clean miss.

Most bird dogs hate woodcock. O'Leary, that staunchest and most dependable of dogs on grouse, pheasant, or quail, hunts woodcock in the vilest of tempers and fairly sneers when you score a miss. I have been told—and there is no way in which it can be verified—that a woodcock gives off but little scent. Consequently, the average dog is frequently within a foot of the bird before the point is made. Then, with the flush, the rapid beating of the small but sturdy wings throws a miniature cloud of dust into the nose and eyes of the dog. O'Leary resolutely refuses to retrieve a dead woodcock; he makes a fine stand and shows scant interest when you pick up the bird.

Woodcock hunting has much to commend it. The season is an early one, usually in mid-October, when the weather is mild but bracing. Early in the month the first flight birds arrive from Canada. They usually rest several days before again taking up the flight. Often, against the great disc of a harvest moon, I have watched a flight of woodcock swinging down to a feeding and resting ground, ebony shadows against gold. Once they light, the flocks break up, scatter.

No game bird is more elusive. I have had a farmer, a handy man with a gun against pheasant, solemnly assure me that there wasn't a single woodcock on his land—and within two hours I have been able to show him the limit of four fine birds. If you have ever tried to spot the feeding ground of the native woodcock, I am sure you haven't had much luck. During the summer months I have tramped swampy acres and prowled along the alders and the tangles of sidehills, close to spring runs, and have seldom raised a single woodcock. But when the same ground is covered in October I find plenty of native and flight birds.

Rumor has it that during the summer the Little Quaker moults and, being a shy and modest soul, goes into retirement—usually the depths of a big cornfield—until such time as the feathers are completely and neatly replaced. During this interval, the Old Timer claims, the young are trained and drilled in the ways of silence, sobriety and fitting modesty.

His hearing is acute. In captivity, observers say, he drops that long and disproportionate bill to the ground, thus establishing a listening post. When a luckless worm wriggles beneath the surface, it is invited to dinner. One stab of that bill, driven deep into the ground with unerring accuracy, assures the worm that it has fulfilled its destiny. Yet, with such an acute capacity for hearing, one wonders why it is that the bird will not take to the air until you almost step on him. Maybe the Old Timer can dig up some theology to cover that point.

Time was when I confined my woodcock hunting to the swampy land along creeks and

C. M. Aldous

Treasures in a woodcock nest

A. O. Gross

Hatching time—one dry, one wet, one egg hatching and one just pipped!

C. M. Aldous

The four young fluffy chicks

streams. The Old Timer taught me the wisdom of combing the sidehills, the scattered clumps of alders and birch along spring runs, and the untidy patches of briers and weeds beside meadow ditches. Immediately my bag increased, as did my enjoyment.

Open shooting, as a rule, prevails when you are out for woodcock. The flights are short but exciting and the birds are easy to mark down. Grouse and pheasant usually get up far ahead of the hunter but the woodcock is reluctant to take to the air. He seldom runs before a dog, and rarely before a hunter without a dog. You walk up, after a point, and peer hopefully into the grass and foliage, trying to spot the bird. If you do, you have very superior eyesight. The protective coloration is practically perfect. A friend who is a photographer of repute discovered a woodcock nest. For weeks he experimented with all of the tricks of photography and the net result was the most terrible set of photographs you ever saw. It was impossible to tell where the ground foliage left off and the woodcock started. The group of photographs used here is most unusual. As a rule, when the bird rises, you are fairly atop of him and, however hardened and expectant you may be, that sudden *whir-r-r* of sturdy wings is likely to startle you into momentary unsteadiness that is a perfect prelude to an absolute miss — with both barrels.

I don't mind hunting grouse or pheasant without a dog. Indeed, I rather enjoy it under certain conditions. But woodcock hunting literally demands a good dog, else you will miss a high percentage of dead birds and about all of your wounded birds. Even with a dog one misses more than I like to think about.

The woodcock population, I judge, doesn't change much from year to year. Not many hunters know about this superlative bird. They seldom appear in flocks and this cuts down mortality. The bird is at once shy and bold; when he becomes a flight bird he feeds in daylight, otherwise he is a nocturnal feeder. He will usually rest, in either event, until absolute trespass on his premises forces him to flight. He doesn't perch on trees or fences because God didn't build him that way, and he shares this peculiarity with web-footed critters. He believes, with rare common sense, that if he isn't seen he won't be hunted. He never crosses the highway ahead of your car; he never frequents barnyards to share the daily corn of chickens, nor does he openly feed in orchards or berry patches. Indeed, he is never seen unless he is in flight. His presence is never advertised. Consequently, he survives, perhaps in greater proportion than any other game bird I can name.

For centuries hunters believed that the derisive whistle associated with the Little Quaker came from the throat and that it was sheer mockery. However, a naturalist exploded the heresy when he discovered that the sound came from a certain wing feather formation that functioned when the bird changed direction at a certain speed. But the sound of that whistle is a thing apart, a haunting fragment of thin music that sweetens October air. Bird imitators, proficient as they may be, never attempt to ape this sound, mostly because they have never heard it and partly because it defies human imitation.

I have known two generations of ardent woodcock hunters. The Old Timer has known at least three such generations. Neither of us has ever known a hunter who scored a double on woodcock—and we have both known some prime wing shots. Seldom, indeed, do you flush a pair of woodcock at the same time. They are elusive in the air, yet giving the man behind the gun the comforting illusion that they are easy targets.

The season, the actual period in which you find woodcock, is short—no more than two weeks at the most in the northern tier of states. As a result, there is not much time to become intimate with the Little Quaker. Shortly after the first frosts some signal must be passed from woodcock to woodcock and, on a convenient night, they hoist sail and are gone over the horizon. The flight appears to be a group movement. Generally, there are few stragglers, and only occasionally will an individual bird remain all winter by some warm spring. One day you can range over a certain sector and find splendid shooting. The next day that terrain is barren of woodcock.

The Little Quaker obviously doesn't like cold weather. I suspect he heads South earlier than most birds. A few successive nights of heavy frost or a thin coating of snow and our sober, furtive, plump friend leaves discomfort and chill for a happier climate.

Mostly those who hunt woodcock are men who have known this fine and sporting bird for decades. We know his virtues. Only O'Leary and his fellow canines regard him with scorn and loathing.

Wherever I may be when there comes a night in early October and the air is like rich wine and there's a harvest moon riding away up in a path of silver stars, a great nostalgia grips me. Whether I am on Broadway or Broad Street, or out in the country, it isn't difficult for me to look up into that moon and pretend I see against it fleeting shadows of flight woodcock.

And, if I pretend very hard, I can close my ears to all other sounds and hear that haunting and derisive whistle of wings as the Little Quaker changes direction. It's then my fingers itch for the cool sleekness of a gun barrel, the comfort of an old hunting coat, soft leather shoes and the gentle voice of the Old Timer.

The Old Timer has lived with his wicked philosophy for almost seventy-three years and his theories are not without virtue. One, at least, I accept without reservation. "God knowed what He was doing when He made woodcock."

WILD FEAR . . . .

By ORPHA MORROW McMILLAN

The woods are budded and the
bright-eyed fawn
Stands motionless and fearful in
the dawn;
Till, reassured, he nibbles at the
grass
And wonders at the hares and
squirrels that pass,
And marvels when they're gone.

He shudders nervously at every
sound,
His bobbed tail twitching round
and round.
But when a blue-jay screams, he
stares wide-eyed,
And leaps the space to his
mother's side,
As an arrow skims the ground

EDITORIAL

CONSERVATION IN A POST-WAR WORLD

THE need and value of a comprehensive national program of physical works for the conservation of natural resources has been emphasized within recent months as an objective of high priority to carry our national effort into fields of constructive enterprise after the demands for machines of destruction have come to an end. The desirability of such works of improvement for the lasting productiveness of our soil, water, forests and other land resources is incontestable. There is the immediate advantage of an outlet for employment when war industries are liquidated. The National Resources Board estimates that from 23,000,000 to 26,000,000 workers must be transferred from defense industries to peace-time occupations when the war is over. This transition must be accomplished without unemployment in order to avoid a serious slump. To accomplish this, the Board has asked for the cooperation of the Nation in focusing on post-defense activities that must be planned now to maintain the war-time prosperity which the country is now enjoying.

The President has appropriately declared that non-defense public works must be deferred. This of course is not only in the interest of the immediate defense program, but postponement will build up a backlog of public works projects to provide for the unemployed. There will be demands for highway construction, rivers and harbors improvement, irrigation works, public buildings and the like. The necessity for the construction of works of this character after a period of deferment can generally be justified. What of the projects of long-range objectives? To what extent will extraordinary public indebtedness and the exactions of heavy taxation be considerations for pushing aside or deferring the plans of the conservationists who build for succeeding generations? How can a program of organic conservation works, on a scale sufficiently broad to be physically and socially effective within a reasonable time, justify its place without undue delay in the highly competitive peace economy to follow the conclusion of the present war?

The Nation in the past has not prepared itself for the adversities of peace. In 1932 this Association suggested that the Bonus Army then encamped in Washington should be employed upon useful work in the national forests. It was only with considerable difficulty that work estimates were prepared although the men immediately involved numbered but a few thousands. A year later, without long-range preparatory plans available, the great Civilian Conservation Corps was launched and over 300,000 men were recruited in more than 1,000 camps throughout the country. At the same time in a laudable effort to meet the growing menace of unemployment the Civil Works Administration, forerunner of the WPA, was established for adult labor and all federal field agencies received urgent telegraphic requests for work estimates and projects that could be undertaken without delay. In view of the expected rise in unemployment when peace comes, the CCC will be as necessary at that time as it was when it was established in 1933. Prudence dictates that the integrity of this institution should be maintained and its work, curtailed during the emergency, directed to the *protection* of our natural resources rather than to their development.

The readjustments that must follow the conclusion of the war are already the subject of protracted inquiries and studies in a number of respects, not only of government but of independent research. In these plans for reconstruction conservation must play its part—a part that may well be overlooked, save in its more obvious, unrelated and immediate phases. Concretely, it is proposed that the cooperation invited by the National Resources Planning Board be undertaken now by conservationists. Through the good offices of the Board, it is suggested that federal and state agencies engaged in the conservation of organic natural resources come together without delay and initiate field studies, surveys, plans, cost estimates and any necessary federal or state legislation for the development of a national program of post-defense works for the realistic conservation of soil, water, forests and wildlife. It is of primary importance that this program should be jointly worked out as between federal departments and all state agencies so that an intelligent presentation of the conservation construction necessities as a whole can be made to Congress and to the public; a program divorced from inter-agency competition for funds. The various phases of the plan should be complementary and collectively should present a bold and physically vast conception of the Nation's need to be met over a definite term of years—a generation!

The gravity of the unemployment problem to come is known now. The time and degree of its precipitation of course depends upon the duration of the defense program at home and the war abroad. Ironically the early conclusion of world peace would make the problem more difficult to meet. "Upbuilding of America," declares the National Resources Planning Board, should be the keynote of the post-defense program through construction projects. The labor potential available when peace comes will be a common denominator of the conservation agencies. The productive use of this supply demands a common plan of action prepared *nationally* and *magnificently*, the principles to obtain for years to come. Now is the time.

TREE CROPS FOR THE TENNESSEE VALLEY

By L. V. KLINE

AS reforestation and erosion control progressed in the Tennessee Valley, the need for trees adapted to rough, hilly, or highly erosive lands, that would provide adequate soil protection and at the same time would increase the productiveness of the lands by yielding valuable timber or other "tree crops" on annual or short rotations was early recognized. This need was the genesis of a study begun by the Tennessee Valley Authority in 1934, and since carried forward as a phase of the watershed protection work of the Department of Forestry Relations under the name of "Tree and Tree Crop Research."

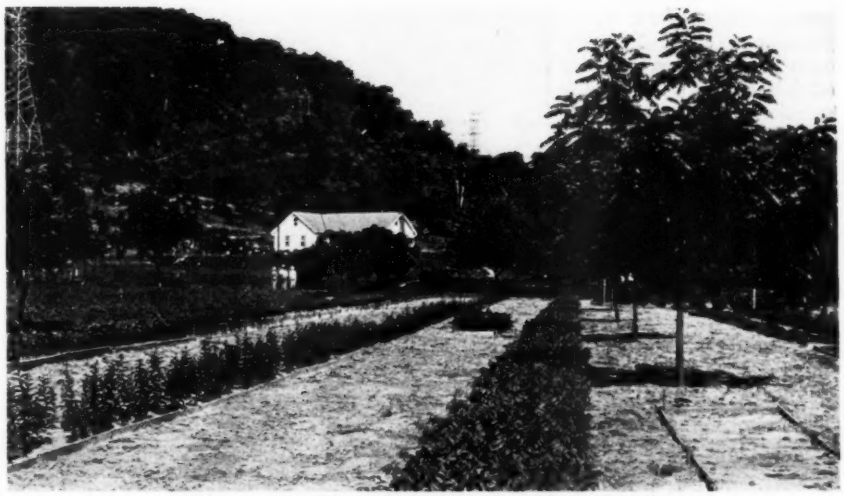
Research involving plant growth is often slow in yielding results; years often must pass before any definite conclusions can be reached. A description, however, of the work under way in tree crop research as well as the results of several completed tests, may be of interest at this time. Although the Authority has made the preliminary studies and propagated the required plants, a number of state and federal agencies also have engaged in the project. State and local agencies are now actively participating in making field tests and in establishing demonstrations.

The developmnt of black walnut culture is important because of commercial value of the nut crop, for many carloads are marketed each year. And the rich kernels, cracked out by hand, add to the cash income of the rural people

Black walnut is one of the important species being investigated. Practically everyone realizes that walnut is one of the most valuable of the native timbers and that fancy veneer bolts and even stumps bring good returns, but not so many realize that the nuts have a real commercial value. In many parts of the Tennessee Valley black walnut kernels are cracked out by hand in the home as a source of cash. An estimate made in 1935, —a light to medium year,— placed the total kernel production at 762,000 pounds, worth about $152,000 to the producers. Of this amount — 700,000 pounds was produced in six counties in southwestern Virginia and east Tennessee. The sale of whole nuts to commercial shelling companies has developed in recent years over practically the entire area of the Valley. Four production centers in and adjacent to the Valley draw an estimated ten million pounds of nuts from the region. The black walnut shelling industry, though not large, is of long standing, and the price paid for nuts has been quite steady. The industry is expanding, due largely to the development of power cracking and separating equipment, each unit capable of extracting kernels from two tons of nuts a day.

While the utilization of the wild walnut crop is the backbone of the present kernel industry and farmers are urged to market their walnuts rather than let them go to waste, attempts are being made to encourage the planting of grafted or budded

stock wherever walnut trees are planted primarily for the nut crop. Several horticultural varieties of black walnut have been grown for a number of years, and many other good but less well-known varieties are available. Nuts from grafted trees of the better varieties, if they could be supplied in quantity, should sell for $2.50 to $3 or more a hundred pounds, compared with a price of from $1.25 to $2 a hundred for common nuts.

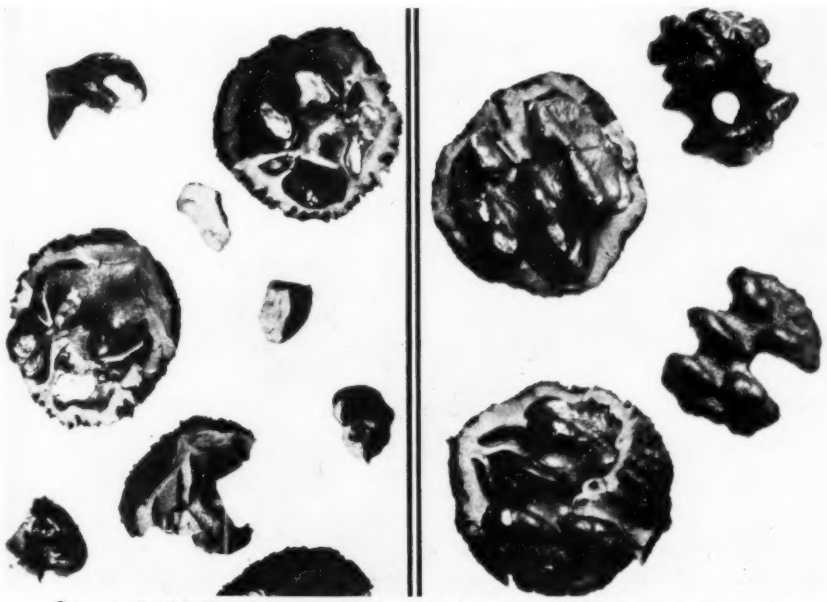


TVA nursery where select types of plants are being grown for experiments in developing improved tree crops

In a test conducted in 1940, in cooperation with a manufacturer of power shelling equipment, samples of nuts from five improved varieties yielded a commercial recovery of kernels of twenty-three to twenty-eight per cent, compared to average kernel yields from wild nuts of twelve to fifteen per cent. For such increased kernel yield, shelling companies can well afford to pay premium prices. Where kernels are extracted by hand, a similar advantage exists since kernel recovery is greater, and the time and effort of extracting is less with the better varieties.

Practically the only labor costs involved in the production of walnuts are the costs of harvesting and transportation. At $2 a hundred pounds of unshelled nuts, the farmer receives as much for his labor as from many other enterprises. He harvests the nuts from scattered wild trees that do not occupy land needed for other uses. The cost of producing better varieties of walnuts should be no greater than wild nuts except for the initial cost of the planting stock, and the returns should be substantially greater. For this reason, the planting of the better varieties is recommended on the farm in places not otherwise used, or where the trees will not interfere with the usual farming practices. Such places are commonly found along fence rows and roadways, around buildings, on steep or irregular areas not adapted to cultivation, and in pastures where some shade is needed. The establishment of plantations or orchards is not recommended since it is likely that the maintenance and overhead costs will wipe out net returns.

In an effort to encourage the more widespread use of grafted walnuts of the better varieties, assistance has been given the state extension services of several Valley states in setting up farm demonstration projects. The purpose of these is to familiarize farmers with the value of improved walnut varieties and to demonstrate successful methods of planting and caring for them. The work is done in the counties where economic and agricultural conditions are favorable for its success. A small number of farmers in a county are selected by the county agent and a farmers' organization to serve as demonstrators. These farmers are supplied with from two to four grafted walnut trees and are given instructions on how to plant and care for them. The trees are planted in favorable places close to the

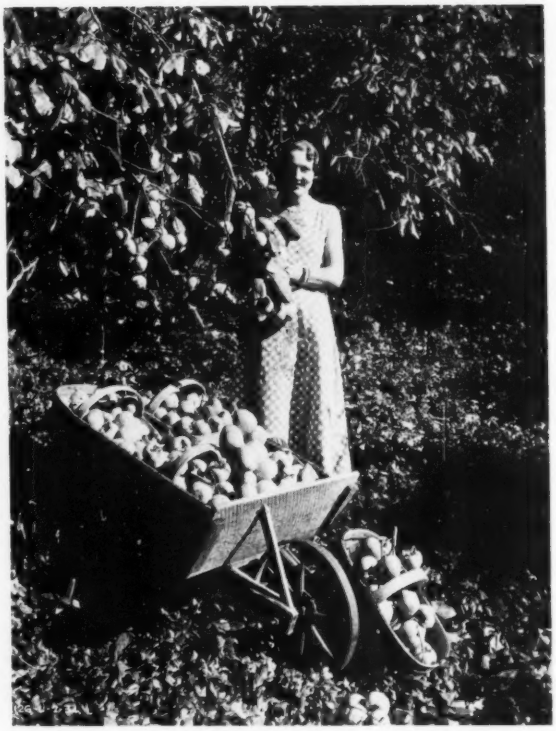


Common "hardshell" walnuts are difficult to crack, produce shattered pieces and require much time to extract, while the better varieties (shown at right) produce nuts of excellent quality, easily cracked and yielding large pieces of the rich kernel

homesite. This work has been in progress for three years, and about 1,350 demonstrations have been established in thirty counties.

In the Tennessee Valley region many farmers make a practice of maintaining a few shade trees in their pastures, and black walnut is one of the favored species. Since the practice of providing shade for livestock is generally recommended by pasture specialists, and since many farmers and agricultural workers have observed that pasture grasses seem to grow well under walnut trees, it follows that crop trees such as the better varieties of walnut should be chosen for the purpose.

Pasture areas in the Tennessee Valley comprise about 4,700,000 acres, or one-fourth of the total cleared area. Various agricultural agencies have been sponsoring the improvement and extension of pastures, and consequently, the land area devoted to pastures is likely to be increased. Much of the land now developed, or likely to be developed, for pasture, is on soils favorable to the growth of black walnut. In consideration of these trends, plans are being made to establish a series of walnut plantations on permanent pastures.



This bumper crop, grown in eastern Tennessee, and studies being made justify the belief that the Japanese persimmon offers much as a tree for cultivation in the Tennessee Valley

In all of the demonstrations made to date, one of the best known walnut varieties, the Thomas variety, has been used. This variety, in addition to producing a nut of excellent quality, has been widely planted on a small scale throughout the East and has a good record for thrifty growth and good crop production. It was therefore chosen as the one variety whose successful performance is assured. There are many other varieties and selections on record, some of which may prove to be better adapted and more valuable in the Tennessee Valley than the Thomas, but more information is needed before a

(*Continuing on page* 482)

Black locust has proved its value as a soil-binding tree in the Valley, and the sweet pods of the honey locust are favorites with the cows. A thornless variety of honey locust has been developed

About fifty million black locust trees were planted in the Valley between 1934 and 1940. Experimentations in the development of straight growing trees will increase greatly the crop of posts and poles

FACTORS IN WILDLIFE POPULATIONS

By WILLIAM MARSHALL RUSH

"WE SHIPPED in some deer from the Pisgah," said the forest ranger on the George Washington National Forest in Virginia, "but as soon as they were released from the crates dogs chased them clear out of the country."

"So native dogs are a factor in maintaining deer in these woods," I commented.

"Yes," he said ruefully. "As long as we have so many hound dogs I don't see how we can count on much wildlife."

The land area of the United States is about 1,903,000,000 acres, of which eighteen per cent are in cultivation, forty-two per cent in pasturage, and forty per cent in desert, heavy forests, mountain tops and cities. On the cultivated areas, our people raise crops which they sell for $5,000,000,000; they raise and sell 439,000,000 chickens and turkeys; they support at least 32,000,000 dogs and cats. On second grade soil, land unsuited for cultivation but suitable for pasture, nearly 190,000,000 head of domestic stock are grazed. The poorest soil, the deserts and the mountain tops, are worthless for cultivation or pasturage. Considering this division and extent of land uses, what chance has wildlife to survive and propagate? What are the factors in the rise and fall of wildlife populations? Mr. Rush, who has devoted years to the study of these factors, here makes some interesting and enlightening observations.—The Editor.

The dogs were only one factor, perhaps the chief one at that time in the attempt to reintroduce deer to that particular region. Others of importance were food supply, disease, hunters, bobcats, suitable breeding places and competition for the range with domestic animals. Many factors contribute to the decline of wild animals, not only in Virginia but in all of these United States. Some are readily apparent, others are more obscure.

To illustrate, let us take a Columbian black-tailed deer and set it down in the Pacific Ocean. There are many mammals which manage very well in that environment, but the deer would be hopelessly doomed from the start. It could not maintain body temperature. It could not elude an enemy such as a shark. It could not adapt itself to new conditions, nor could it move to another "range." It would die. In this case it is easy to see that a deer could not exist in an environment suited to whales, sea lions and sharks. The reasons are obvious, the factors clear.

Suppose, however, a Columbian black-tail is placed in the Pikes Peak region in Colorado, at an elevation of from 8,000 to 12,000 feet. The Rocky Mountain mule deer does well there, but we cannot expect its cousin, the coast deer, to thrive or even to live very long in that environment. The reasons are not so obvious, but there are very marked differences between the natural habitats of the two species in humidity, average and extreme of temperature, altitude, condition of snow, nature of predacious animals and especially in the food plants available. The coast deer would not know how to protect itself against the Rocky Mountain coyote, Canada lynx, golden eagle and puma. It would be apt to show little or no resistance to diseases and parasites prevalent in the animals of that region. It might not know about loco, death camas, and other poisonous plants. If the transplant were made the coast deer would die and we would say in a general way that it was not fitted for the environment which suits the Pikes Peak deer.

As a third example, Columbian black-tailed deer have been transplanted to the Atlantic Coast where it was expected they would be able to adapt themselves. But they did not. In this case climate, food and other conditions seemed favorable, but for reasons not at all apparent, as in the two foregoing examples, the change was too great. It may have been insufficient humidity, lack of minerals or vitamins in the diet, or even more obscure factors. The nervous shock of capture and transportation alone may have been enough to upset a highly organized animal such as the Pacific Coast deer to the extent that breeding and rearing young in a new home was impossible. Or the presence of dogs may have been the determining factor in the failure of this transplant.

A fine illustration of how wildlife, disturbed by a change in environment, must either adapt to new conditions, migrate to a region where conditions are suitable, or die is furnished by the California quail. These birds have been transplanted to as widely separated points as New Zealand, Chile, Juan Fernandez Islands, Hawaiian Islands, Vancouver Island, Natal South Africa and France, as well as practically every one of our forty-eight states. In some cases they breed and increase, in others they barely hold their own, and in many areas they quickly die out. Apparently they can adapt to a change in environment much more readily than the coast deer, but not well enough to meet marked variations from their natural home in western United States.

The questions involving factors which have to do with wildlife populations are invariably interesting in their implications. The grizzly bear for evident reasons cannot long survive in the United States, but why should not the wolverine thrive? It is comparatively small, does no particular harm to man or domestic animals, and its fur is not valuable. Why should the wolf reach the point of extermination while its near relative, the coyote, thrives in the face of the most brutal persecution ever devised by man? The black-footed ferret has been a rare oddity since its description by Audubon and Bachman in 1851. It has always been scarce, although from the standpoint of shelter, food and opportunity to breed its environment seems to be perfect. Such examples can be cited interminably and even extended to some of the human races. Why, for instance, do most of the tribes of American Indians persist in a steady decline while the African negro shows a wonderful rate of increase in population?

There are doubtless specific reasons in every case why a certain genera, species, or individual thrives or declines in an environment different from that in which it developed. Unfortunately, it is sometimes most difficult to discover what those reasons are.

Perhaps the most obvious and certainly the most important factor in the decline of wildlife populations is the one of usurpation of natural wildlife habitat by human beings and their domestic beasts. The late Dr.

Joseph Grinnel, of the University of California, has given us a principle worth remembering. He said: "No two species of identical, or even closely similar biological predilections can long occupy the same niche or ecological space at the same time."

The eminent zoologist goes on to explain: "If the same food supply in kind and amount, if the same type of shelter for roosting or resting, or if the same sort of breeding places be resorted to by two species there will be inevitable conflict. One or the other species will give way, because it is bound to be at less advantage in some respect as to structural equipment or instinctive manner of reacting to the condition about it."

In the light of this axiom let us consider the following statistics: The land area of the United States is about 1,903,000,000 acres. The most productive part of this area, as far as plant and animal life is concerned, is about 343,000,000 acres which are plowed and cultivated to crops. Thirty-two million people live on these 343,000,000 acres and raise crops which they sell for about $5,000,000,000. They also raise and sell 438,926,000 turkeys and chickens besides an enormous number which they themselves consume. As a guess, there are probably at least 32,000,000 dogs and cats also on this acreage. Not much chance for wildlife here.

Next comes the 800,000,000 acres of pasture and rangeland on which graze some 189,000,000 head of domestic stock. This area includes practically all of the land suitable for pasture and unsuited to cultivation. Surely wildlife hasn't much chance on this portion of the land either.

There remain 760,000,000 acres, almost all of which are worthless for cultivation or pasturage of domestic stock, but also worthless in the main for wildlife. These 760,000,000 acres represent the sands of the deserts, the granite mountain tops, the heavily forested lands, the acres taken up by cities and the great stretches of soil worthless for one reason or another.

The United States Fish and Wildlife Service in 1941 placed the number of game animals, the size of peccaries and larger, at a little less than 6,000,000 for the entire United States. If there are 6,000,000 big game animals in this country, they are competing for land with 132,000,000 people, 180,000,000 domestic animals, probably 500,000,000 turkeys and chickens, and innumerable dogs and cats on all but the most barren parts of the nation.

The very fact that the big game ranges are so crowded that a sizable percentage of the normal increase each year dies of starvation and that their food supply becomes less plentiful yearly through overuse should convince even the most skeptical that there is not room for any more livestock, either wild or domestic, in the United States. This is further borne out by the reports of soil impoverishment and soil erosion over large parts of the country and the serious depletion of range and pasturage lands.

The space that a wild animal needs to live in is an important factor aside from that needed to produce an adequate food supply. A mother deer about to give birth to her fawns needs a sizable area free from all disturbing influences. The presence of a band of domestic sheep, several cows, roving dogs, men, or even other wildlife such as elk, constitute a disturbing element, a change in environment. A nesting grouse cannot hatch and rear her young where other animals come in to take over or share the space she needs for this purpose.

There is a certain limitation, an optimum area needed by each wild thing, which cannot be imposed upon without a harmful effect on the wild creature.

Animals that adapt themselves to civilization lose their wild character to a great degree and become more or less domesticated. The mongrel China pheasant, turkeys and in many localities deer, are good examples. It must be remembered that all of the present day domestic animals are progeny of wild species that were adaptable to close contact with civilization.

Besides the multitude of detailed factors that enter into the wildlife problems of the country, ranging all the way from sun spots to foot worms, there are some little understood long-time factors that are important. Paleontology teaches us that many species of animals have become extinct in the past and without the influence of a great human population. The reasons advanced for the gradual disappearance of these species are not as clear as we would like to have them, but there is every reason to believe that all of these factors are operating today, exactly as they were a million years ago.

Of the reasons which paleontologists give for species extinction, climate is the cause most often cited. Changes in climate such as marked raising or lowering of temperature or humidity, winds of extreme velocity, excessive rain or snowfall, drouth, are all capable of changing the conditions surrounding an animal sufficiently to bring about its death.

Several examples of what might have happened to the oreodons for instance, or the three-toed horses, which once overran the Great Plains by the millions, can be given from a knowledge of present day factors which affect grazing animals. We know something of the importance of minerals in the diet of grazing animals. Soil and forage deficient in iodine cause thyroid trouble. Iron deficiency of the soil such as is found in New Zealand causes progressive anemia of cattle. Calcium-phosphorus deficiency causes severe diseases of domestic stock in a great many parts of the world and scientists are just beginning to learn about vitamins.

Under a certain set of climatic conditions wild animals become adjusted during their thousands of years of development to an environment that provides them with sufficient minerals for their needs. Then comes one of the climatic changes, let us say a drouth. Plants are deficient in calcium-phosphorus in dry weather and after a time the grazing animals become stricken with rickets. They have a depraved appetite that causes them to eat putrid carcasses and chew on the skeletons of dead animals. As the drouth continues the creeks and lakes dry up and the animals congregate around the remaining water holes by the thousands. The living animals avidly devour the dead in their craving for minerals. The decaying carcasses, alive with pathogenic bacteria, aggravate an already desperate condition. The predacious animals find the weakened survivors easy prey. Besides rickets, other diseases would flourish as the water holes became foci for the dissemination of harmful bacteria and parasites. Blackleg, hemorrhagic septicemia, bubonic plague, tularemia, lumpy jaw, foot rot and perhaps other diseases of which present day science is not cognizant. Larva of bot-fly, ova and larva of tapeworms, intestinal worms and lung worms would multiply. Scab mites, lice, ticks and flies would flourish for a time. For every year the drouth lasted the extinction of grazing animals would extend over wider and wider areas until, if it lasted long enough, all would be gone.

In a prolonged wet cycle, on the other hand, diseases such as liver flukes and foot worms would become intense. Hordes of blood-sucking insects would multiply. Fossil tsetse flies have been found in this country and the suggestion made that this insect may have been a factor in the extinction of the three-toed horse.

A cold, wet cycle of deep snows and ice would cause starvation of animals unable to migrate.

There are many present day examples of how drouth, severe winters and other abnormal weather conditions affect wildlife populations and domestic animal populations as well. One need only mention the winters of 1886-87 and 1919-20 in the West to illustrate this point, or the prolonged drouth since 1927. Such losses as fifty to seventy-five per cent of the Northern Yellowstone elk herd in one winter, fifty to eighty per cent of the deer in northwestern Montana and northern Idaho, and many others are recorded. These long-time factors are mentioned as a prelude to the statement that some of the present day species were no doubt on the decline and on their way out when this country was discovered by the white man. The invasion of civilization hastened the extinction of these doomed species. A classic example is that of the American bison. No one with any degree of rationality will claim that this species was exterminated by the rifles of the hunters. Yellowstone Kelly makes reference in his book of that name to the "black death" epidemic in the buffalo herds of Montana. He wrote of the period 1866-1880:

"These animals were in good condition and bore no marks of bullets or arrows. The cause of their death was a mystery to us. As we marched over the plain to the valley of the Cheyenne the appearance of so many carcasses scattered around made a strong impression on my mind."

The European bison which was a close relative to the American species was contemporary with such species as the hyena, mastodon, elephant, rhinoceros, Steno's horse, lion, grizzly bear, reindeer and cave bear in England and France in Cro-Magnon days. It became practically extinct in 1860, thousands of years after these other species had passed out of the picture.

Doubtless there were other factors which entered into the final extinction of the passenger pigeon than killing by hunters, and also into the rapid decline in numbers of many other species in this country.

U. S. Fish and Wildlife Service

The factors involving wildlife populations are many and interesting, but native habitat is most important. As the author points out—with special reference to the Columbian black-tailed deer pictured here—sharp environmental changes are usually disastrous

Local extinction comes first and the extent to which this threatens over wider areas is indicated by the list of year-long protected species in the game code of every state. The species of wildlife that interfere with agriculture are either extinct on the 343,000,000 acres of cultivated land or are being fought by the farmers as "birds and mammals injurious to agriculture."

Those species which interfere with domestic livestock are pretty well beaten down on the 800,000,000 acres of pasture and rangelands. The remainder of the land is largely unsuited for one reason and another to the production of any kind of animal life, either domestic or wild.

Therefore, the whole proposition for small game narrows down to the fringes of cultivated land such as fence rows, a bit of woodland here and there, the borders of irrigation ditches and an insecure tenancy of land that man needs for his crops or livestock; for big game, to forested lands, rough mountains and an occasional bit of the prairie, in competition with 179,000,000 domestic animals.

There is, of course, as much hope for continued propagation of the species that can be produced artificially in incubators (of which the China pheasant is the star example) as there are for Rhode Island Reds and Plymouth Rocks, but the western sage grouse, pinnated grouse and others which cannot conform to civilization are doomed.

The wildlife enthusiast should remember, however, that there is little chance even for a "Chink" in a plowed field or a strawberry patch, little chance for an antelope in a wheat field, or a deer in a young orchard. A herd of elk is not particularly welcome around the stockmen's haystacks, nor in the pasture lands they have reserved for winter use, nor is a grizzly bear to be tolerated near a band of sheep. More consideration should be given to factors, not only the short-time factors such as disease, winter food supply, conflict with agricultural interests, predacious species, dogs and cats, hunting take and the like which are highly important, but also the long-time factors which are no less important because they are not so well understood.

BIG GAME INCREASING IN NATIONAL FORESTS

Big game animals, nearly doubling in number on the national forests every ten years since 1908, are now estimated at more than 2,000,000 head, according to the United States Forest Service. This means that one-third of all big game in the country is located in the national forests, while in the western states, three-fourths of the big game animals make their home all or part of the year in national forests.

A TEACHER WORKSHOP FOR CONSERVATION

By FRANCIS L. DRAG and RUSSELL W. BEESON

Photographs by Eugene J. Portugal

THE STORY is often told that, in the sixties, settlers coming by pack and wagon train into the land of the Modocs in northern California moved through valleys filled waist-deep with luxuriant grasses. Fertile meadows lined the streams; wheatgrass and bluegrass grew abundantly on the lava plateaus; forest-clad slopes were thickly carpeted with many varieties of bunchgrass. The fibrous roots and matted growth of these grasses protected the soil and conserved the not too abundant rainfall.

This was the last frontier in California, a land of promise nestled between the open desert of Nevada and the Klamath country in Oregon. The range was free; settlers had only to select a tempting spot, preempt a homestead, and turn their stock to graze on the open range. Life went on; herds grew in size as well as in number as new settlers arrived. Large timber companies acquired the bulk of the ponderosa pine timber. To the pioneers, the prospects looked good. By the turn of the century the population had increased manyfold, small communities buzzed with activity, and it looked as if there could be no end to the prosperity that lay ahead.

But these hardy settlers, who sacrificed much in the building of homes, farms and towns, were not aware of what they were doing to their promised land, of the almost insurmountable obstacles they were creating for their children's children. Could they have looked into the future, past just one generation, to the early forties of the twentieth century, the transformation would have astounded them.

Where is the land the first settlers found in the sixties? Grass in the valleys no longer whips about the bellies of roaming herds. Instead there is sagebrush and foreign annual bromegrass, nature's way of protecting the soil at least partially with plants less easily damaged by overgrazing. Gone is the bunchgrass and with it the thin layer of rich topsoil which nurtured it and through which the scanty rainfall of the region quickly percolated to be conserved and utilized. Gone,

Teachers of Modock County, California, make the outdoors their workshop for acquiring factual material for later class use. Here a forester is explaining the value of the forest as one of the basic resources of the county

also, is most of the ponderosa pine, quickly liquidated by the large timber companies to escape increasing carrying charges. With the soil no longer protected by grasses and timber even the meager rainfall of this country results in destructive floods with their loads of silt, gravel, and boulders.

It is useless to decry the shortsightedness of the pioneer. Americans have always failed to recognize damage to natural resources until it is almost too late. However, it is now evident that the basic wealth of the Modoc country is being rapidly depleted. If people are to maintain a high standard of living, something must be done. Fortunately, before the land is shorn of all its usefulness to mankind, they are awakening to their plight. Local, state, and national organizations are cooperating in an attempt to preserve, rebuild, and use wisely our only material heritage—the land and its products.

One of the most practical efforts in Modoc County has been made by the educators. The future of any country lies with its children. However, if the children are to be given an understanding of the value of forests, land, water, wildlife and recreational areas in their community, the teachers themselves must first of all have a deep and abiding appreciation of these values. To approach the problem in such a way that the teachers would gain an understanding of existing conditions and the relation of these conditions to local welfare, and at the same time would acquire sufficient factual information about the flora and fauna of the region, about soil and other conditions, necessitated a departure from methods generally in use. Accordingly, under the direction of the County Superintendent of Schools, the teachers were organized into study groups for the purpose of making a survey of the basic resources of the Modoc region.

During the winter of 1939-1940, teacher committees throughout the county were engaged in gathering data on natural resources and becoming acquainted with various aspects of local and national conditions. Their work included the reviewing of available literature and discussing among themselves as well as with lay people and conservation workers such problems as: What will be the future of forestry in Modoc County if timber cutting continues at the present rate? What is the range problem? What per cent of the soil in the area has been badly eroded and what are the contributory factors? Other activities included the review and discussion of such films as "The River," "The Plow That Broke the Plain," "Four Thousand Gifts of the Forest" and "Pine Ways to Profit," and visits to a reforestation project, overgrazed areas, and government-controlled

The teachers, organized into study groups, eagerly plan and prepare conservation material

In the teachers' workshop laboratory—constructing an insect cage

Flower study engrosses this group of teachers, just back from a field trip

logging areas. The idea of holding a teachers' workshop for conservation education was an outgrowth of this study. At the close of school in the spring, sixty people, most of whom were teachers, gathered for two weeks of intensive study of problems which had been uncovered by the teacher committees during the winter.

A questionnaire previously filled in by those who attended the workshop indicated their interests and needs. They wished to become acquainted with the flora and fauna of the region through field trips, to learn to identify birds, flowers, trees and range grasses. They wanted to know something about the geology of the region. To give the workshop practical application they wished to learn to use educational films, slides, and pictures effectively; to carry on laboratory work in identifying plants, and to make collections of plant and insect specimens.

That the broader aspects of the winter's study might not be overlooked in a maze of scientific detail, they wished to consider the relation of natural resources to such basic industries as lumbering, stock raising, dairying, recreation, and government. Ultimately, they wanted the children in their classes to consider such problems as: How does the water supply affect community life? In what way is recreation related to the wise use of natural resources? How do the forests contribute to the life and welfare of the people of Modoc County? What are the problems faced by sportsmen and farmers regarding wildlife? Why is Modoc County's basic industry, stock raising, a serious problem at the present time? With plans completed, there remained the execution of the workshop itself. The new Modoc Union High School was the ideal meeting place, with its workrooms, library, laboratories, shop, social hall, and recreational facilities. Funds, available through the County School Department, a ten dollar fee paid by each participant, and several hundred dollars contributed by local people, financed the cost of visiting instructors and necessary supplies.

Some of the members of the workshop teaching staff were: Dr. J. Paul Leonard, associate professor of Education at Stanford University; Dr. Vesta Holt, head of the Department of Biological Sciences at Chico State College, who had charge of all laboratory work related to nature study; Dr. Lillian Lamoreaux, director of curriculum of Santa Barbara City Schools, who aided elementary teachers in planning to use the information gained in the workshop in their school programs. Others present for short periods for special work included the educational director and the biologist of the Soil Conservation Service and a geologist from Chico State College. The personnel of the Modoc National Forest planned and conducted field trips and participated in general sessions, contributing their findings and beliefs regarding the management of timber, wildlife, and range. J. C. Hays, county agricultural agent, participated in general discussions regarding the agricultural conditions of the county.

Although the program was flexible, permitting shifts in schedule to fit needs as they developed, the morning was usually given over to an hour's general discussion to which the public was welcome, followed by meetings of smaller groups, which continued throughout the afternoon. General sessions were concerned with such matters as the aim and structure of the workshop, the place of conservation education in the modern educational program, the problem of conserving and utilizing natural resources in Modoc County, and the teaching of conservation in the classroom with consideration of such controversial issues naturally involved, as: Game management, forest depletion, fire hazard, and range management. Although discussion was continued in the group meetings, for the most part the time there was spent in individual work on teaching materials.

The field trips were varied to meet the expressed needs and desires of those composing the workship. There were six early morning trips to study bird life. An afternoon trip to study grazing problems, soil erosion, and forest depletion was culminated by a dinner served by the CCC boys in Hackamore Camp. Their work, especially in combating the infestation of pine beetle, was explained. Other afternoon trips were devoted to the study of the geology of the region. There was an all-day trip to the Lava Beds National Monument and the Tulelake Wildlife Refuge. Another afternoon was spent inspecting the peat-moss beds in the Warner Mountains, a new industry in Modoc County.

At the last session the group indicated that the workshop had been to their liking and requested that it be carried on the following year. The participants had gathered a wealth of teaching material to use in their classrooms. They had also gained a truer insight into the needs of the children of Modoc County and, in so doing, had become united in their aim at an education arising from the needs of the land and its people.

It is always easier to point out mistakes than to rectify them. Since nature takes some thousand years to produce an inch of top soil, it is idle to hope for the return of the Eden that greeted the pioneers. But at least we have in our power the means to keep the Nevada desert from creeping up and engulfing the land of the Modocs. At least our children's children, with the heritage of understanding and knowledge born of experience that we can give them, may live and work to be rewarded with a greater measure of prosperity than we now enjoy.

COLOR SCHEME

"Greens clash with blues, so think no more
about it."
Thus spoke my sage, sophisticated friend;
Nor for a single moment did I doubt it,
Believing that the two could never blend.

Well meant her words, yet fraught with what
deception;
How wrong was she, how credulous was I;
I learned the truth when through my own
perception
I saw dark pines against an azure sky.

— Hildreth M. Allison

A PIONEER PASSES

By WILLIAM F. JACOBS

THE Raynes tung oil tree is doomed. A great pioneer is passing to its reward, and within the lifetime of the tree may be found the whole story of the tung tree—and a new industry—in America.

It was in December, 1901, that Dr. David Fairchild saw a Chinese junk at Canton that "did not seem to be painted, but was coated with an oil or varnish." The coating proved to be oil pressed from the fruit of the tung tree, *Aleurites Fordii,* which grew in the vicinity of Hankow and farther up the Yangtze River. This oil, when spread and exposed to air, oxidized and formed a hard, waterproof film.

L. S. Wilcox, consul general to China, had already called attention to this remarkable substance but his report was filed unnoticed in the State Department. In 1902, he sent seed to California for experimental planting, but there is no record of the results.

It was not until two years later that the tung tree definitely came to America to stay. In that year, 1904, Mr. Wilcox provided Dr. Fairchild with 1,000 seed which were planted at Chico, California. During the next two years, about 800 trees, grown from these seed, were distributed on the Pacific Coast and throughout the southern states to public agencies and interested individuals for experimental plantings.

Five of these seedlings were sent to the superintendent of a cemetery at Tallahassee, Florida. They were planted but given little attention and, in the autumn of 1906, William H. Raynes, who had become interested in these neglected aliens, secured permission to transplant them to his home. Only one of the trees survived the move. Dr. Fairchild says of Mr. Raynes: "With the instinct of a real investigator, he sent me careful notes about his tung oil tree every year, giving a full account of the behavior of his pet. He had ground the nuts into meal, and pressed out the tung oil into bottles. He was the first observer to take an intelligent interest in the tree, and I have always considered (*Continuing on page* 496)

The Raynes tung oil tree in its seclusion and retirement, in 1938

And all that was left of this pioneer in 1940—a mutilated and dying snag

BOXELDER

***Acer negundo*, Linnaeus**

BY G. H. COLLINGWOOD

THE WINGED seeds of boxelder, whose clusters hang on the bare branches through the winter, place this tree with compound leaves within the family *Aceraceae*. Because a Malayan tree, *Vitex negundo*, has leaves similar to those of boxelder, *Acer negundo* would mean "a maple with negundo-like leaves."

It inhabits borders of streams and lakes from New England to Florida and across the eastern States and Canada to Alberta and the eastern slopes of the Rocky Mountains. Usually forty to fifty feet high with two or three foot diameters, individual trees reach seventy-five feet and are four feet in diameter. The short, crooked trunk usually divides into several irregular spreading branches to form a wide bushy crown.

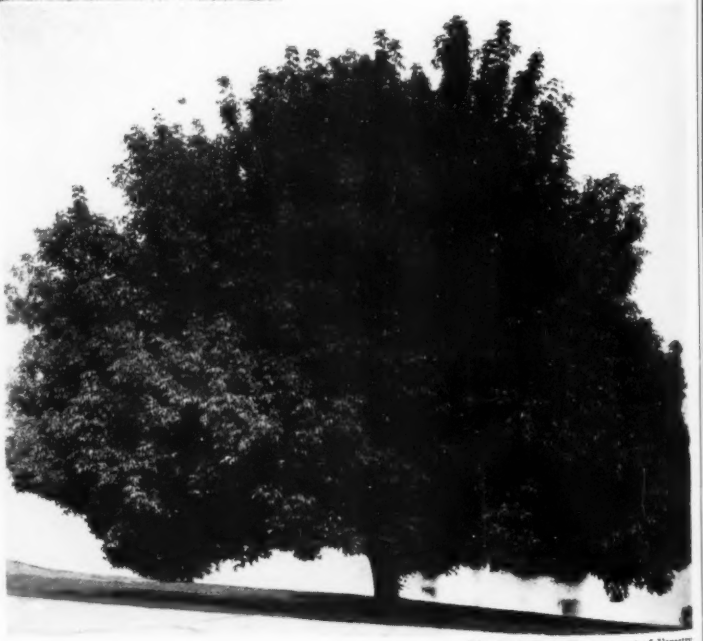
Boxelder is often scattered in company with bottomland hardwoods like white elm, hackberry, silver maple, and black walnut. It is most abundant in the Mississippi and Ohio valleys, but ability to thrive in dry areas has increased its occurrence in the prairie states. In good soils, diameter growth may equal an inch for each of the first fifteen or twenty years. Thereafter growth slows down until sixty or rarely a hundred years is reached. In contrast with other maples, the opposite leaves are compound, composed of three to seven, or rarely nine, short stalked leaflets. Each leaflet is irregularly toothed, two to five inches long, one to three inches wide, pointed at the tips, sometimes three-lobed, and pale on the under surface. The entire leaf turns yellow in the autumn before dropping and leaves a scar nearly surrounding the green stem.

In April or early May before or with the unfolding

Early division of the short trunk gives box elder a low broad bushy crown

Devereux Butcher

Clusters of V-shaped keyes hang for months from the branches of pistillate trees



Maryland State Department of Forestry

leaves tiny yellowish green flowers appear on growth of the preceding year. Drooping clusters of pistillate or female flowers occur on trees separate from those which bear the hairy clusters of staminate blooms.

One to two inch V-shaped winged keys or double samara hang in six to eight-inch clusters from early summer into spring. Their broad membraneous wings converge into narrow pointed nutlets. Heavy crops of moderately fertile seeds are borne each year to be blown far from the parent tree and germinate in moist soils of open lowlands. Boxelder also sprouts from the stump collar.

The pale gray brown bark is a quarter to a half inch thick, shallowly broken into narrow, firm, flat-topped ridges which crack horizontally into thick irregular short scales. On young trunks, branches and twigs it is smooth, greenish or purplish, with conspicuous raised lenticles or pores, while the twigs are sometimes coated with a powdery white bloom.

The soft, close-grained creamy white wood, lightest of the American maples, weighs about twenty-six pounds to the cubic foot when air dry, and has scarcely half the strength and stiffness of sugar maple.

Boxelder trees frequently attain lumber size but are rarely cut for lumber. The wood is sold with that of soft maple and used for crates, boxes, slack barrels, handles, paper pulp, charcoal, cheap furniture, woodenware and fuel. Occasionally low grade maple syrup or sugar is obtained from the sap.

Until the beginning of the twentieth century boxelder was widely planted for street and windbreak purposes. These uses are now usually discouraged because of its short life, frequent injury by wind and sleet, tendency to attack by several sucking, defoliating and boring insects and its susceptibility to heartrot.

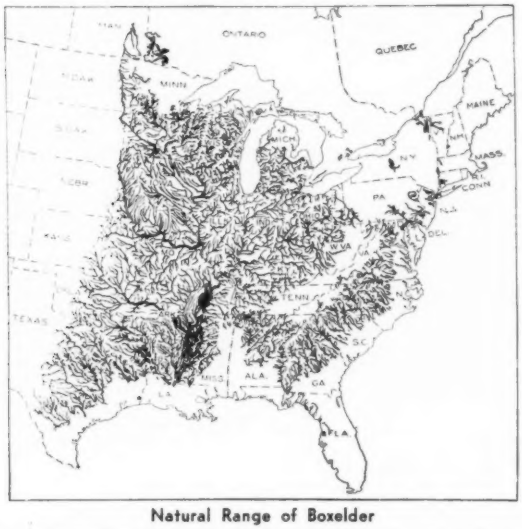
George J. Baetzhold

Yellow-green pollen-bearing flowers appear with the new leaves on staminate trees

The shallowly fissured gray-brown bark is scarcely half an inch thick

George J. Baetzhold

Each pinnately compound leaf has three to seven irregularly margined leaflets



Natural Range of Boxelder

TREE CROPS FOR THE TENNESSEE VALLEY

(*Continued from page* 472)

final choice can be made. The foundation has been laid for finding more valuable and better adapted varieties and for testing their performance. Data were secured on practically all known varieties and selections, and field plantings of the most promising selections have been made throughout the Valley.

The cost of grafted black walnut trees is an important item in determining the extent of their use on farms throughout the Valley. From the nurseryman's point of view, the cost of the stock depends on the volume of sales. One way of lowering the cost of the trees is to popularize their planting, thus creating a greater demand for stock and permitting a reduction in nursery costs due to volume production. The other way is to reduce the cost of growing the stock by more efficient and less expensive methods. Tests and experiments are now in progress to develop cheaper methods of producing the trees.

In addition to the walnut studies referred to above, several other investigations on this species are under way. Records are being kept on the crop production of about 130 walnut trees of varying ages to determine the expected nut yields over a period of years. Records are maintained on the flowering habits of the more important varieties and selections. As time passes and more of the young trees in the experimental plantations begin to bloom, a file of information will be available to determine which varieties should be interplanted to provide proper pollination. A study is also being made of the effect of different nut harvesting and storing methods on the color and attractiveness of the kernel.

Since the chestnut blight has practically wiped out the native American chestnut, the loss of this tree has been keenly felt, and considerable work is in progress to find suitable substitutes of blight-resistant species and varieties. Much work is being done by the Bureau of Plant Industry of the United States Department of Agriculture. In the Tennessee Valley certain tests are being made by the Authority with Asiatic chestnuts, and in this work much help has been received from other agencies.

In the studies concerning the use of blight-resistant types of chestnut, emphasis is placed on the value of the trees as nut crop producers. An arboretum is maintained at Norris, Tennessee, where a number of species and varieties are grown for observational purposes. From these plants, selections are to be made of the varieties best adapted to the conditions of the Valley.

Possibilities of the Japanese persimmon as a crop tree also are being investigated. It grows well in the climate of the Tennessee Valley and is an early and abundant producer of fruit. This species is somewhat like our American persimmon; the leaves, however, are larger, thicker, and more glossy. The fruit is as large as a well-developed tomato and is generally firm and astringent until thoroughly ripe, when it becomes sweet and soft. It is very high in food value, only a fraction of the dry weight being non-digestible fiber. About seventy-five per cent of the dry weight is in the form of fruit sugar.

Since the turn of the century, there have been several cycles of interest in the commercial production of this fruit in the United States. The development of a fruit industry, however, comparable to the citrus or pecan industry was not realized. This may be largely accounted for because of the public's lack of familiarity with the fruit and the fact that when it is firm enough for shipment and handling, it is not sufficiently ripe to be palatable. When ripe enough to be eaten, it is too soft to be handled as a market commodity.

The failure of Japanese persimmon to achieve a place of commercial importance on the fruit market does not necessarily indicate that it is unsuited for the home orchard, or that the fruit might not be profitably utilized in other ways than as a market fruit. The relative freedom from pests, the early and abundant fruiting, and the high food value of its fruits recommend it for attention and study. Its possible value in converting certain highly erosive or rough lands into productive poultry range or hog pasture merits testing.

A foundation has been laid for the study of the usefulness of the Japanese persimmon in the land use and farm economy of the region. Plant material has been secured from the Bureau of Plant Industry, and more than a hundred introductions have been propagated and grown in an arboretum at Norris. As more stock becomes available, additional observational test plantations are to be established over a wide distribution in the Valley.

Black locust is another important species being studied. It has wide application as a soil-holding and soil-building tree. From 1934 to 1940 about fifty million black locust trees were planted in the Tennessee Valley, principally for erosion control purposes, through the cooperative efforts of a number of agencies and the Authority.

Locust is quite sensitive to soil conditions. For the success of a plantation, it is necessary to know and take account of soil and moisture conditions. This has been demonstrated by research and is supported by the experience of foresters wherever locust is planted extensively. The availability of phosphates plays an important role in its growth. In a test of the effect of phosphate fertilizer on locust made on Clarksville cherty loam, one of the dolomitic limestone soils of the Valley, the phosphated trees had grown about twice as rapidly as the check trees

(*Continuing on page* 494)

TREES AND THEIR USES—No. 59—BOXELDER

BOXELDER, A RAPID GROWING TREE, IS FOUND FROM NEW ENGLAND TO FLORIDA ACROSS THE EASTERN STATES, AND IN CANADA TO ALBERTA AND THE EASTERN SLOPES OF THE ROCKY MOUNTAINS.
AN IRREGULARLY SHAPED TREE WITH LIMBS THAT SEEM WILLING TO GROW IN ALL DIRECTIONS, IT INHABITS THE BORDERS OF LAKES AND STREAMS, FAVORITE HAUNTS OF BOYHOOD. BUT BECAUSE OF ITS ABILITY TO THRIVE IN DRIER SOILS AS WELL, THIS TREE IS BECOMING INCREASINGLY COMMON IN THE PRAIRIE STATES.
BOYS AND GIRLS LIKE THE LUSTY BOXELDER IN THE EARLY SPRING BECAUSE THEN THEY CAN CUT ITS LOOSE BARKED TWIGS TO MAKE WHISTLES. THESE ARE JUST ABOUT AS GOOD AS THOSE MADE FROM THE WILLOW.
BOXELDER HAS WINGED SEEDS SIMILAR TO THOSE OF THE SUGAR MAPLE. AND LIKE THIS CLOSE RELATIVE, PRODUCES SAP. BUT ONLY A LOW GRADE SYRUP OR SUGAR IS OBTAINED FROM THE SAP.
THE WOOD OF BOXELDER IS SOFT, WEAK AND CLOSE-GRAINED. IT IS USED FOR CRATES, BARRELS, BOXES, PAPER PULP AND CHEAP FURNITURE.
ONCE POPULAR FOR STREET AND WINDBREAK PURPOSES, THIS TREE HAS GRADUALLY LOST FAVOR AS IT IS SHORT LIVED AND SUBJECT TO FREQUENT INJURY BY WIND AND SLEET.
-FABER-

CANADA'S FORESTS FIGHT FOR DEMOCRACY

(*Continued from page* 457)

Canada, too, was trying to conserve United States dollars for the purchase of munitions and mechanized war supplies. The situation, therefore, summed up to this: Canada must increase timber sales to the United States and reduce importation of hardwood timber from the United States. This would increase the favorable trade balance for Canada and make available more American dollars for the purchase of munitions, airplanes, and other vital needs from south of the border.

Another policy that affected Canadians directly and improved the Dominion's foreign trade balance was stated in these words: *"Canadian requirements must be met from goods that cannot be exported."* In other words, the shoemaker's children, while not asked to go barefooted, must wear sandals instead of boots.

Canadians were required to use second-grade lumber that could not be exported. As Mr. MacMillan expressed it, "The first essential is to cut our coat according to our cloth." How was this to be done? That has been the question facing Canadian timber and lumber officials in this wartime emergency that makes timber more valuable than gold.

Government specifications, they decided, must be broadened. The timber industry must do its own policing to see that first-grade, exportable timber was not used in Canada. They had the more difficult task of convincing high department officials of the Army, Navy and Air Force that they must be content with second-best lumber. Civilians, too, had to be appeased for the sake of foreign commerce.

Still another problem faced the Timber Controller and his advisory committee. Wood must be substituted wherever possible for steel and iron products—and this must be *Canadian* wood. Steel and iron were needed in munitions industries and for mechanized equipment for the armed forces. Building industries, it was pointed out, must whenever possible revert to the use of timber. Canada could not afford to spend United States dollars for building materials when wood manufacturers could substitute a suitable Canadian product.

Expert timber buyers for government purposes were scarce in Canada. This presented another problem. Officials were anxious to avoid the skyrocket inflation prices for wood products experienced during the World War. Orders must be placed, it was emphasized, with lowest reliable bidders. Timber was needed immediately, however, and naturally there was at first some difference in prices paid. This brought a few critical remarks in the House of Commons on Parliament Hill.

Inspection of delivered products must be instituted, officials agreed, both for the protection of the government and the reputation of the lumber industry. The Timber Controller did not want to pay for second-grade lumber and have fourth-grade material delivered for government construction. Consequently, every contractor was required to report the price paid and the name of the vendor for all lumber purchased. Each vendor, in turn, was asked to present a signed statement to the effect that his shipment conformed to the grades ordered. A system was devised for check inspections.

Avoidance of a price-wage eruption during the war emergency and of a price-wage spiral following the expected sharp reduction of activity after the war is the general government policy. "The most important thing we're doing now," Mr. Nicholson told me, "is the development of our price control plan."

ALLAN S. NICHOLSON—CANADA'S TIMBER CONTROLLER

Lumberman and native of Ontario, Mr. Nicholson's fair dealing in purchasing and his development of a wartime price control plan have won him the cooperation of Canada's entire lumber industry

C. D. Howe, Canada's American-born minister of Munitions and Supply, under whom the Timber Controller operates, announced on May 30, 1941, that a definite basis of prices, starting May 26, had been established for lumber and mill work sold in Canada. Development of this plan has been largely in the hands of the timber industry itself, and its enforcement is under the authority of the Timber Controller. Lumberman committees were set up at once in each of twelve producing and distributing centers, with definite price scales established for each district.

"The twelve district committees set up in producing or distributing regions are working with enthusiasm, and the entire plan is operating smoothly," Mr. Nicholson announced on July 29, after the plan had undergone two months of operation. "This, we feel, is indicative of what can be accomplished by an industry when given the opportunity to keep its own house in order."

Canada's timber production, Mr. Nicholson told this writer, is approximately 4,500,000,000 board feet annually. About 2,000,000,000 of this are used by the Canadian public and government. Of the balance, about 1,500,000,000 board feet go to the United Kingdom and 1,000,000,000 board feet go to the United States and other foreign markets, including Australia, New Zealand, South Africa and South America.

South American timber importations from Canada reach a significant figure. Out of $26,869,000 worth of Canadian exports to South American nations in 1940, newsprint, pulp and box shooks accounted for $9,794,000. Canadian-South American trade is likely to increase in the immediate future. European sources are largely closed. Besides, a Canadian trade mission, headed by Canada's Minister of Trade and Commerce, James A. MacKinnon, is undertaking an extensive commodity-exchange journey to South America.

Canadian wartime timber policies have brought favorable results. Wood products have become the Dominion's most valuable export commodity from the standpoint of favorable trade balance—so badly needed for purchasing war materials from the United States.

Canada's commodity trade with foreign nations during the calendar year of 1940 (excluding non-monetary gold and forest products), according to one report, showed a deficit of $199,000,000. Non-monetary gold exports, however, brought the Dominion a profit of $203,000,000. Excluding forest products, therefore, the favorable balance from foreign exchange was only $4,000,000.

Forest products, however, greatly changed the financial picture. Wood, wood products and paper exported by Canada totaled $348,498,000. Imports of forest products totaled only $38,100,000. This left a favorable foreign trade balance of over $310,000,000 from Canadian forests and boosted the total favorable trade balance to $314,000,000.

Forest industries provided full-time employment during the pre-war decade for an average of 179,500 persons in Canada. Seasonal lumbering operations expanded this to an estimated 350,000 workers. Annual salaries and wages averaged $157,000,000. Canadian forests, you can well realize, are of vast commercial importance in peacetime as well as during the war emergency.

British Commonwealth Air Training

(*Continuing on page* 495)

Seventeenth National Shade Tree Conference

THE planting of trees and shrubs as part of a broad camouflage program to make military and other objectives safer from enemy air and artillery attack was revealed at the Seventeenth National Shade Tree Conference held in Washington, D. C., August 26 to 29. Major R. P. Breckenridge of the U. S. Engineers Corps, told the conference that camouflage methods have advanced rapidly during recent months, and that whereas artists were in demand during the first World War to do camouflage work, it is the landscape architects who play the most important part today. It is not a question, he said, of completely hiding a target, but of making it less visible. This is accomplished in part by planting trees around buildings to absorb shadows, by the use of dummy trees on roofs to break straight lines, and by growing grass and vines on roofs for vegetative texture. Major Breckenridge stated that the Germans have been using trees planted in tubs with casters so that they can be moved about.

The use of parasites to combat the Japanese beetle menace was described by E. N. Cory, state entomologist of Maryland, and president of the conference. Great progress has been made in this method of control, he said, revealing instances in Maryland where annual traps of the beetle have been reduced from 1,200 quarts to 200 quarts.

A blight threatens the madrone trees in the north bay region of California, according to Roger Sohner of San Anselmo. In a discussion of arborist work in California, he revealed that because funds were not available for investigation the blight is as yet unknown, and that this highly decorative species is dying throughout the area. Should the madrone blight fail to be checked within its present area, it may eventually spread throughout the entire madrone range which extends from southern California north along the coast of Oregon and Washington to British Columbia.

Among the speakers on the program were George S. Langford of College Park, Maryland, who dealt with the tolerance of shade trees to spray materials; and D. S. Welch, of Cornell University, who declared that more knowledge is needed on the subject of roots before many shade tree troubles can be properly diagnosed.

Leading the discussion on shade tree planting and care and pest control were P. P. Pirone, research specialist of the New Jersey Experiment Station; A. Robert Thompson, National Capitol Parks, Washington, D. C.; and Paul Tilford, of Wooster, Ohio.

Observe Golden Anniversary of First National Forest

THE fiftieth anniversary of the establishment of the first national forest is being celebrated this year. Cody, Wyoming, headquarters of the Shoshone National Forest, on August 24 had a gala day of festivities to mark the Shoshone's arrival at the half-century mark. Earle H. Clapp, acting chief of the Forest Service, took part in the celebration along with a number of old-timers who knew and worked on the national forest during the earlier years of its existence. These pioneer forest rangers recalled the days when they started out on the uncharted job of protecting and administering vast areas of forest, pretty much on their own. Long, hard rides in rough country, long periods of isolation, and frequent antagonism of local settlers, were the rangers' lot. They got $60 a month and had to furnish and feed their own saddle and pack stock.

What is now the Shoshone and a part of the Teton national forests in Wyoming, was originally designated on March 30, 1891, as the 1,239,040-acre Yellowstone Timber-Land Reserve. The first proclamation required a second, confirmatory proclamation which was dated September 10, 1891.

About the only administration given the reserve for several years after its establishment were sporadic attempts at preventing timber and grazing trespass, and some effort to check fires. In 1903, the Wapiti ranger station was built, first in the United States constructed with government funds. The first forest reserve telephone line was constructed from Cody to Wapiti in 1904. A wagon road through the Shoshone to Yellowstone Park was opened a year later. Opening of the Cody road to auto traffic in 1916 marked the beginning of intensive recreational use of the forest.

Today the Shoshone National Forest comprises 1,566,406 acres, managed for perpetuation and orderly use of its varied resources. The area supports a stand of some 2,250,000,000 feet of timber, protects the watersheds of two large irrigation projects, provides summer range for 10,000 cattle and 75,000 sheep. It contains magnificent scenery, and even in pioneer days drew visitors from all over the world. It was the favorite rendezvous of Colonel William Cody, more widely known as "Buffalo Bill." With the development of modern transportation and camping facilities, the recreational use of the forest has grown rapidly in recent years. Two large wilderness areas have been designated within the forest to perpetuate the natural and virgin conditions characteristic of the high mountain back country. The Shoshone is noted for its big game.

While there had been some previous reservations of public timberland,—establishment of the Shoshone was the first reservation of public land in the United States to afford a basis for perpetuation of the forest as a permanent resource. It was the beginning of the national forest system which now contains 160 national forests and nearly a tenth of the land area of the United States, under administration of the federal Forest Service.

Secretary of Agriculture Claude R. Wickard sent greetings to those attending the celebration at Cody and called for more conservation and development of American forests. Through Earle H. Clapp, acting chief of the Forest Service, Secretary Wickard said: "We can make America a land of abundance for all of our people, and we are determined to do it. To this end, we must use our land and water resources wisely and productively, not only in time of emergency, but for all time. I cannot conceive of a really satisfactory future for the American people if we ignore the one-third of our land which is, or should be, in forest.

"America needs the products of the forest, including the timber, grazing land, watershed protection, wildlife, and recreation, just as she needs the products of cultivated fields and orchards. As a nation, we are started, but only started, on the road which will lead to genuine conservation of our resources and to the use of our land in such a way that it will be most productive, today, tomorrow, and all the tomorrows to come."

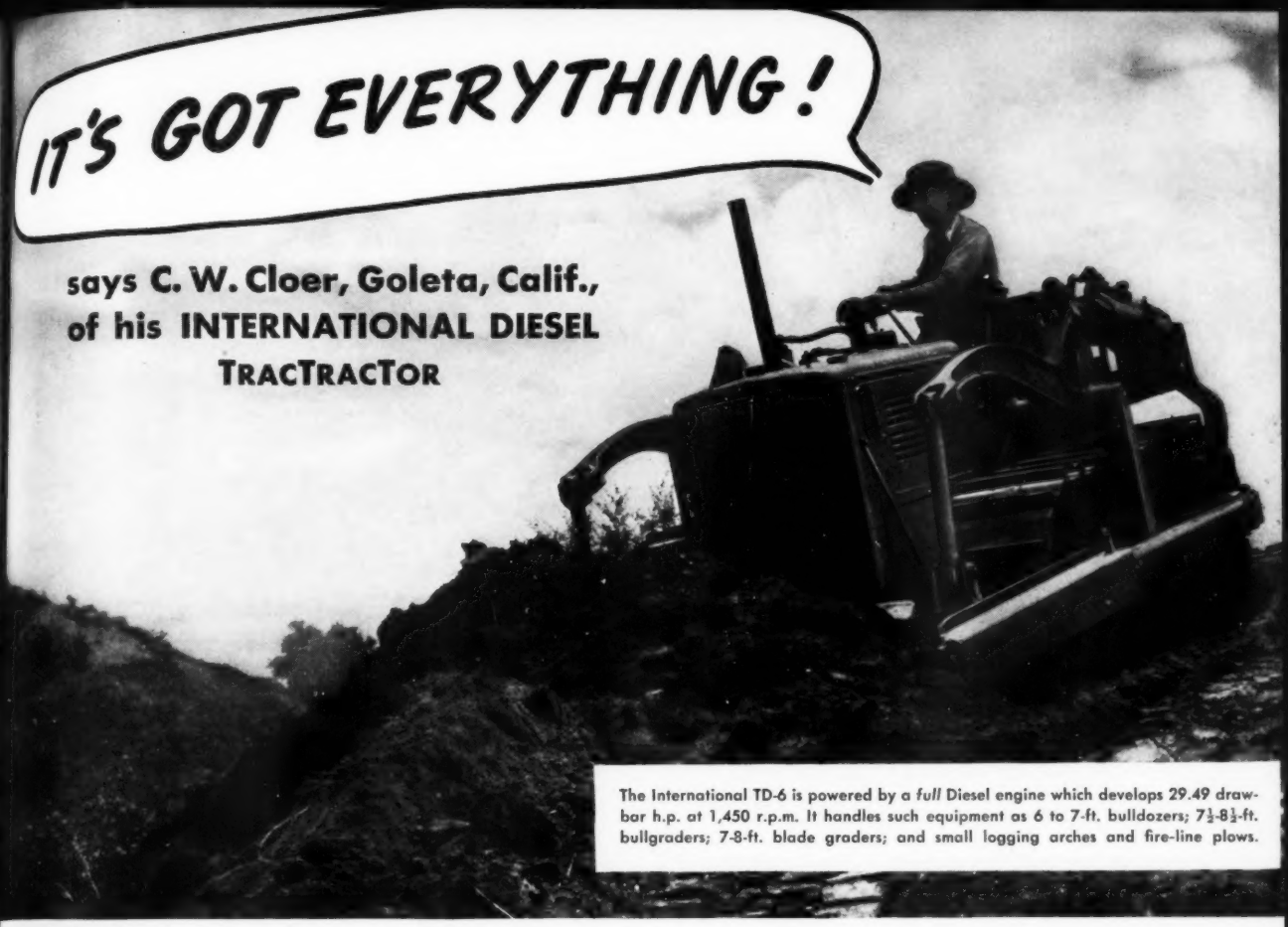
In his address Acting Forester Clapp outlined some of the benefits resulting from establishment of the national forests, but added that resources in the national forests could and should be better managed. The most acute forest problems today, he said, have to do with privately owned forests. To meet these problems, Mr. Clapp advocated public regulation of private forest practices and increased public ownership of forest land. He said, "Only these are bold and drastic enough to give positive assurance that the job will be done.

"Public regulation of forest practices on privately owned lands simply means that the public will set a floor of forest practices adapted to local forest conditions below which cutting may not go, a floor which will stop further destruction of our forests, stop further deterioration which in the long run is equally bad, and keep the land reasonably productive. Since the most democratic countries in the world have had to adopt this measure, it need and should not lead to either bureaucracy or a dictatorship. It can instead be made one means of preserving our democracy."

Of public ownership, he said, "Millions of acres of our forest land today are submarginal for any private ownership; either because the land is too poor or because the destruction has gone so far that no private owner can afford to bring the forest back. On additional millions of acres the public interest is so great that it can only be protected by public ownership."

IT'S GOT EVERYTHING!

says C. W. Cloer, Goleta, Calif., of his INTERNATIONAL DIESEL TRACTRACTOR



The International TD-6 is powered by a *full* Diesel engine which develops 29.49 drawbar h.p. at 1,450 r.p.m. It handles such equipment as 6 to 7-ft. bulldozers; 7½-8½-ft. bullgraders; 7-8-ft. blade graders; and small logging arches and fire-line plows.

"MY INTERNATIONAL TRACTRACTOR surely has the power—and can it climb! Best tractor for climbing I ever handled, and I have driven several different makes. *It's got everything!*"

No wonder Mr. Cloer is so enthusiastic about his International TracTracTor. He's got himself a great little crawler—a sure-footed tractor that hugs steep grades; that gets up, down, and around the rough Santa Ynez Mountain country; and with the help of a bullgrader does a first-class job of making fire guards.

Mr. Cloer is shown on his International, clearing fire guards, or fire lanes, on the Tecolote Ranch near Goleta. Heavy growth of scrub oak and brush is removed from the ridges between creeks and gullies to prevent spread of forest fires and to provide cleared lanes or trails for fire fighters to use. The TD-6 is able to do this work much faster and much more efficiently than with hand labor formerly used. The fire lanes cleared this year should be in good condition for three or four years, Mr. Cloer believes.

This California forest fire prevention work is typical of the many tough and varied jobs International TracTracTors can handle profitably and efficiently. Ask the nearest International Industrial Power dealer or Company branch for full information about the complete TracTracTor line—Diesel and gasoline.

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An Opportunity to Pay Tribute to Fire Heroes

The American Forest Fire Medal Board was created in 1937 to recognize outstanding cases of personal heroism in fire fighting by the award of the Forest Fire Medal. The Board consists of a representative of each of the following organizations: The American Forestry Association, Society of American Foresters, Charles Lathrop Pack Forestry Foundation, Association of State Foresters, and the National Lumber Manufacturers' Association.

In order to establish this Award on a permanent basis, a fund or foundation of not less than $3,000 is believed necessary. Cash balance on hand totals $2,573.18. Your assistance in completing this fund is hereby solicited. It is believed that foresters, forestry, park, and all forest protection associations, as well as other conservation groups, will welcome the opportunity to contribute. Contributions of $1.00 or more from individuals and larger amounts from organizations will be welcomed. Contributions should be sent to:

THE AMERICAN FORESTRY ASSOCIATION

919 SEVENTEENTH STREET, N. W.
WASHINGTON, D. C.

CONSERVATION IN CONGRESS

While details of the 1941 Revenue Act were being decided upon by Congress, a smattering of forestry and conservation bills continued to be introduced. As the year draws to a close, however, it becomes apparent that little important forestry legislation will be enacted in this session of Congress. It is significant that after six months from the date of submittal of the Joint Congressional Forestry Committee report, not one of the Committee's recommendations has been enacted. Many of the Committee's recommendations have not yet been introduced.

Aware of the necessity to protect our forests in time of war, Congress has indicated its appreciation of the importance of making emergency fire control funds availab'e. Contained in the Second Deficiency Appropriation Act for the 1942 fiscal year, approved by the President on July 3, is a $1,100,000 item to be used for emergency forest fire control in and around critical defense areas, such as manoeuver grounds, cantonments, and plants manufacturing important defense products.

Of this amount $1,000,000 was allocated to the States of California, Oregon and Washington. California received $500,000, of which $460,000 will be spent to control fires on national forests and $40,000 for state and private cooperation which must be matched with an equal amount from the State and private timberland owners. Oregon was allocated $251,000, of which national forests received $86,000 and state and private cooperation nearly $165,000. Washington received $249,000, including $94,000 for national forests and $155,000 for state and private cooperation.

These funds were available at the time of the July forest fire emergency on the West Coast. Emergency crews hired with part of these funds did yeoman service in helping the regular crews keep the outbreak under control. The remaining $100,000 is now being used on similar emergency projects in the states of Massachusetts, New York, Maryland, Virginia, Arkansas, Georgia, Texas, North Carolina, and South Carolina. It should be pointed out that the $1,100,000 appropriation is in addition to the regular Clarke-McNary forest fire cooperation item of $2,425,000 as contained in the Department of Agriculture Appropriation Act for the 1942 fiscal year.

President Roosevelt, on August 21, sent Congress a supplemental estimate of appropriations for forest products research totaling $217,500. If approved this amount will be used by the Forest Products Laboratory for research and technical service in forest products needed in the present emergency. Particular emphasis will be placed on methods to relieve the demand for aluminum alloys by substitution of wood and plywood in aircraft construction. This deficiency appropriation would increase the total Forest Products Laboratory appropriation for the 1942 fiscal year to $1,000,000.

On August 18, the President approved S. 752, now Public Law No. 216, which provides for the establishment of the Coronado International Memorial, in the State of Arizona. Commemorating the explorations of Francisco Vasquez de Coronado, the Memorial cannot be officially proclaimed until the Government of Mexico has provided for the establishment of a similar adjoining area in Mexico. Limited grazing of livestock, prospecting and mining will be permitted.

Representative Edward T. Taylor, of Colorado, Chairman of the House Appropriations Committee, passed away on September 3, at the age of eighty-three years. There followed considerable speculation as to his probable successor as Chairman. Democratic members of the Committee having longest service records are Representative Clarence Cannon, of Missouri and Representative Clifton A. Woodrum, of Virginia. Both were sworn in as House Members on March 4, 1923, and as Appropriations Committee members on December 12, 1929. Alphabetical arrangement caused Cannon's name to be placed ahead of Woodrum's on the Committee's records. On September 17, Representative Woodrum withdrew his name as a candidate and the House Committee on Committees named Representative Cannon as Chairman. Chairman Cannon has not as yet decided whether he will continue as chairman of the sub-committee on agricultural appropriations.

The historic Northern Pacific Railway land grant case involving approximately 2,900,000 acres has been settled by an agreement between the railroad and the U. S. Department of Justice. Approved by the Senate and House Public Lands Committees, the terms of settlement were recently embodied in a U. S. District Court decree in the State of Washington. Under the terms of settlement the railroad relinquishes its claims on 2,900,000 acres of land grants; conveys approximately 363,000 acres of land valued at $1,200,000 to the Government and makes a $300,000 cash settlement. The United States Government agrees to discharge its claim against the railroad and drop litigation with respect to alleged violation of the land grant law.

Title to the 2,900,000 acres has always been in the United States. Mostly included in national forests and national parks the status of this land will not be changed by the settlement. The 363,000 acres, conveyed by the railroad to the government, is transferred to the public domain and will be administered by the Department of the Interior's General Land Office. It has been suggested that Congress transfer

this land to existing national forests and national parks since much of it is already contained within forest and park boundaries.

Dating back to Civil War days, the case is regarded as an outstanding one in the annals of jurisprudence. One of the most involved cases to be found in the court records of this country, the controversy has motivated more than a score of Congressional actions, including the appointment of four commissions for the classification of the lands as to their mineral or non-mineral character, and the appointment of a Joint Congressional Committee to investigate the administration of the grants.

National Park Jubilee

The National Park Service on August 25 observed the twenty-fifth anniversary of the passage of Congressional legislation which created it as a bureau in the Department of the Interior. On that day ceremonies commemorating the Silver Jubilee were held in national parks throughout the country. At Washington, D. C., the celebration was climaxed by a campfire program and an address by Newton B. Drury, director of the Service. Feature of this program was the lighting of twenty-five candles on a gigantic cake, each representing an important event in the years of the Service's active life.

State Foresters to Meet in Virginia

The twenty-second annual meeting of the Association of State Foresters will be held at Old Point Comfort, Virginia, October 13-15. The meeting is expected to draw together foresters from every state in the union and represents the annual gathering of men concerned with questions affecting the welfare and progress of state forestry.

The convention sessions will be held at the Chamberlin Hotel and will open the morning of October 13 with an address of welcome by N. Clarence Smith, Chairman of the Virginia Conservation Commission. A feature of the program will be a panel discussion on October 14th of current forestry problems, including the questions of forests and national defense and the need of public regulation of timber harvesting by owners of forest lands. The Association's banquet will be held the evening of the same day. Secretary of Agriculture Claude R. Wickard and James H. Price, Governor of Virginia, are expected to be the speakers. The final day of the meeting, October 15th, will be given over to field trips.

CORRECTION

In the August issue of AMERICAN FORESTS, W. C. Lowdermilk, in his article "Written in the Syrian Desert", described Nathaniel Shaler as "a noted geologist of Yale". This is in error. Mr. Shaler was associated with Harvard University.

12 INDIAN FIRE PUMPS FEATURE NEW APPARATUS

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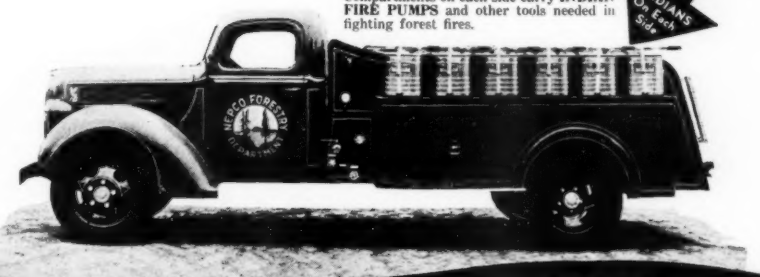

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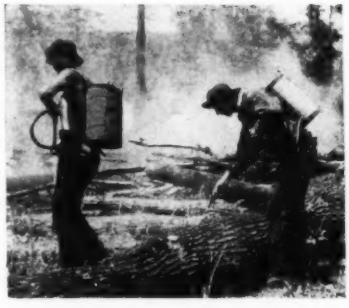

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CONSERVATION CALENDAR

Important Bills in Congress with Action July 30 to September 5, 1941

BILLS ENACTED

S. 752—HAYDEN—To provide for the establishment of the Coronado International Memorial in Arozina. Passed Senate May 26, 1941. Passed House August 4, 1941. Approved by the President August 18, 1941.

H. R. 4911—WHITTINGTON—Authorizing the construction of certain public works on rivers and harbors for flood control, etc. Passed House June 20, 1941. Passed Senate July 28, 1941. Approved by the President August 18, 1941.

H. R. 587—KING—To extend the provisions of the act providing that the United States shall aid the states in wildlife restoration projects. Passed House June 11, 1941. Passed Senate August 11, 1941. Approved by the President August 18, 1941.

BILL VETOED

S. 1200—BANKHEAD—To authorize additional appropriations to provide for the further development of cooperative agricultural extension work. Passed Senate April 4, 1941. Passed House July 21, 1941. Vetoed by the President July 31, 1941. Senate Document No. 100.

GOVERNMENTAL FUNCTIONS

S. 1365—MCCARRAN—To set aside 300 CCC camps to be used exclusively to train men for work in defense industries. Introduced April 22, 1941. Reported with amendments (No. 656) by the Senate Committee on Education and Labor, August 14, 1941.

NATIONAL FORESTS

H. R. 4975—ELLIOTT—To add certain lands to the Sequoia National Forest, California. Passed House August 4, 1941. Referred to the Senate Committee on Public Lands and Surveys, August 5, 1941.

NATIONAL PARKS

S. 1836—HAYDEN—For the purchase of certain mining claims within the Grand Canyon National Park, Arizona. Introduced August 11, 1941. Referred to the Committee on Public Lands and Surveys.

H. R. 2300—ROBINSON, UTAH—To correct the description of land added to the Bryce Canyon National Park. Passed House August 4, 1941. Referred to the Senate Committee on Public Lands and Surveys.

H. R. 3014—HOOK—To accept the cession by the State of Michigan of exclusive jurisdiction over the lands embraced within the Isle Royale National Park. Passed House August 4, 1941. Referred to the Senate Committee on Public Lands and Surveys.

H. R. 4336—JACKSON—To accept the cession by the State of Washington of exclusive jurisdiction over the lands embraced within the Olympic National Park. Passed House August 4, 1941. Referred to the Senate Committee on Public Lands and Surveys August 5, 1941.

H. R. 4386—HOOK—To provide for the addition of certain lands to the Isle Royale National Park. Passed House August 4, 1941. Referred to the Senate Committee on Public Lands and Surveys August 5, 1941.

PUBLIC DOMAIN

S. 633—VAN NUYS—To amend the Criminal Code in respect to fires on the public domain or Indian lands or on certain lands owned by the United States. Passed Senate June 9, 1941. Reported by the House Committee on the Judiciary (No. 1149) August 11, 1941.

H. R. 5490—PIERCE—To authorize the Secretary of the Interior to quit-claim to the States of Oregon and California, respectively, all the right, title, and interest of the United States in and to the lands of Goose Lake in Oregon and California. Introduced August 4, 1941. Referred to the House Committee on the Public Lands.

WATER AND STREAM CONTROL

H. R. 4161—GEARHART—To authorize the construction of the Pine Flat-Kings River Project in California. Introduced March 25, 1941. Reported with amendment (No. 1174) by the House Committee on Flood Control August 13, 1941.

H. R. 5549—RANKIN, MISSISSIPPI—To provide for the creation of conservation authorities and for other purposes. Introduced August 11, 1941.

AFA Committee on Elections Named

THE Board of Directors of The American Forestry Association has named the following Committee on Elections to nominate officers to serve the Association during the calendar year 1942: Harris A. Reynolds of Boston, secretary of the Massachusetts Forest and Park Association, chairman; Dr. Walter C. Lowdermilk of Washington, D. C., assistant chief, Soil Conservation Service; and Charles A. Gillett of Norfolk, Virginia, industrial forester, Seaboard Air Line Railway.

According to the By-Laws of the Association, members are entitled to make nominations independently of the Committee for any or all offices to be filled. Such nominations, however, should be signed by not less than twenty-five Association members in good standing and should reach the Committee on Elections, The American Forestry Association, 919 17th Street, Northwest, Washington, D. C., not later than November 1, 1941. The Committee's nominations, together with any made by the membership, will be submitted to all members of the Association for letter ballot vote during the month of December.

Officers to be elected for next year include a President, twenty-one Vice-Presidents, Treasurer and four members of the Board of Directors. All are to serve terms of one year with the exception of three Directors whose elections are for five years to fill expiring terms of Henry S. Graves, John C. Merriam and Karl T. Frederick. The director elected for one year will serve out the unexpired term of Vanderbilt Webb, who resigned last year. Frank E. Mullen was named by the Board to fill Mr. Webb's office through 1941.

Rare Trumpeter Swans Increase

THE rare trumpeter swan, which is on the verge of extinction, apparently is holding its own in the United States, a joint report of the Fish and Wildlife Service and National Park Service revealed early in September.

At least 211 of these huge birds are found on the Red Rock Lakes National Wildlife Refuge, Montana, Yellowstone National Park, Wyoming, and the surrounding area. Last year 190 of the birds were reported. The count was conducted cooperatively by personnel of the two services. In addition to the small flock in the Red Rock Lakes-Yellowstone region, another group of trumpeters is being protected in Canada.

Officially classified as the largest migratory waterfowl in North America, the trumpeter no longer migrates over long distances. Until recently, movements of the United States flock were generally confined between the refuge and the park. This year adults and cygnets were found for the first time on Hebgen Lake, which lies between the two sanctuaries.

Once an abundant bird, the trumpeter swan population declined so rapidly that during the early part of the century the species was thought to be extinct. Then a small flock was discovered in the Yellowstone Park region and efforts were begun to restore the species.

This year's count showed a total of 142 adults and sixty-nine young, while last years there were 122 adults and sixty-eight young.

A breakdown of the present flocks shows there were ninety-six trumpeters on the Red Rock Lakes Refuge—fifty-two adults, forty-four young—fifty-nine on Yellowstone Park — forty-four adults, fifteen young—fifty-one on surrounding lands—forty-one adults, ten young—two adults transferred to the Malheur National Wildlife Refuge, Oregon, and three adults transferred to the National Elk Refuge, Wyoming.

Trumpeter swan populations since annual counts have been made are as follows: thirty-three in 1934; seventy-three in 1935; 114 in 1936; 168 in 1937; 148 in 1938; 199 in 1939; 190 in 1940; and 211 in 1941.

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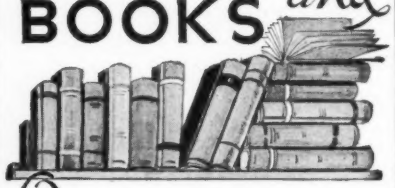

A list of Selected Books on Forestry and related fields of Conservation is available to members of The American Forestry Association on request.

LOOKOUT: The Story of a Mountain, by Robert Sparks Walker. Published by Southern Publishers, Inc., Kingsport, Tennessee. Illustrated. 282 pages. Price $2.00.

Tucked away in the Deep South there is a mountain ridge stretching across the northwest corner of Georgia, with its northern tip extending into Tennessee beside the town of Chattanooga, and its southern end reaching down into Alabama. Its name is Lookout Mountain.

This is historic territory, filled with natural wonders. Besides the countless varieties of plant life, the strange "rock cities," the ancient cliff dwellings and waterfalls strewn over its surface, it is honeycombed with weird and beautiful caves extending for miles throughout its length.

A valuable record for those who know Lookout Mountain, the book is a revelation to people who have not been there.

MAINTENANCE OF SHADE AND ORNAMENTAL TREES, by P. P. Pirone. Published by the Oxford University Press, New York. Illustrated. 422 pages. Price $4.50.

Dr. P. P. Pirone, Associate Professor of Plant Pathology at Rutgers University, and Research Specialist in Diseases of Ornamental Plants at the New Jersey Agricultural Experiment Station, now fills the need for a book that gives up-to-the-minute information and advice on the care of shade and ornamental trees.

The book is divided into two parts. The first, bearing the title *General Maintenance Practices*, covers such subjects as transplanting, fertilizing, pruning, cavity treatments, bracing and cabling; while the second, entitled *Specific Abnormalities of Trees*, discusses the diagnosis of tree troubles, insect control, and spraying equipment and practices. The last three chapters, which comprise a third of the book, describe the symptoms and causes and means of control of the diseases and insect pests of many species of ornamental shrubs and trees.

This is truly a book that will prove invaluable to all who own or care for trees.

CONSERVATION AND CITIZENSHIP, by George T. Renner and William H. Hartley. Published by D. C. Heath and Co., Boston, Massachusetts. 367 pages. Illustrated. Price $1.60.

This book was written to inform teenage citizens of America that health, happiness, prosperity and life itself are dependent upon natural resources. Beginning with the days of our first settlers, the authors give a vivid portrayal of the waste and exploitation of these resources, and tell what is being done today to restore and save them. The last chapters take up the human side of the picture by dealing with such topics as unemployment, low income, negro problems, slum living, etc., explaining what remedies are being taken in regard to each.

WILD DUCKS. Published by the American Wildlife Institute, Investment Building. Washington, D. C. 35 pp. ills. Price twenty-five cents.

The sportsman will welcome this handy, pocket-size booklet, with its sixteen beautiful full color illustrations of game birds by Fred Everett, for they offer a source of immediate identification of his bag. The booklet is, as well, filled with brief but intensely interesting and informative reading by wildlife authorities, and the attractive back cover is a reproduction, in four colors, of the principal migration routes in this country.

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The publications listed below must be ordered direct from the addresses as given and not through the Association.

The Country Book—A Quarterly Digest of country living from the country. Published quarterly at Camden, N. J., by The Country Book, Inc., Vol. 1, No. 1—single copies 35c, $1.20 a year.

The Civilian Conservation Corps and Public Recreation, and *The CCC and National Defense*. Federal Sec. Admn., Civilian Conservation Corps. Govt. Printing Office, Wash., D. C.

Forestry—(Vocational and Professional Monographs) by Lewis C. Swain, M. F. Bellman Publishing Co., Six Park St., Boston, Mass. Price 50c.

American Forestry Association—Papers Presented At Annual Meeting. By George Cecil, Conservation Division of the Los Angeles Chamber of Commerce, Los Angeles, Calif. Price $1.00.

Transactions of the Sixth North American Wildlife Conference, 1941. American Wildlife Institute, Investment Bldg., Wash., D. C. Pirce $1.00.

Plants Useful in Upland Wildlife Management, by W. L. McAtee. Cons. Bull. 7, Fish and Wildlife Service, U. S. Dept. Int. Supt. of Docs., Wash., D. C. Price 10 cents.

Forest Research: 1940. Pac. N. W. For. and Range Exp. Sta., U. S. Forest Service, Portland, Oregon.

Forest Resources of Shelby County, Ohio, by Cornell A. Root, and *Forest Resources of Butler County, Ohio*, by Jesse M. Byrd. The Ohio Forest Survey, Wooster, Ohio.

New Landmarks on Soil Conservation. Soil Cons. Serv., U. S. Dept. of Agr. Govt. Printing Office, Wash., D. C.

Cedar, Cypress and Redwood Tank Stock Lumber, Commercial Standard CS92-41. National Bureau of Standards, U. S. Dept. Commerce. Supt. of Docs., Wash., D. C. Price 5 cents.

Protect Hardwood Stands from Grazing, by W. K. Williams. U. S. Dept. of Agr. Leaflet No. 86. Supt. of Docs., Wash., D. C. Price 5 cents.

Kiln Design and Development of Schedules for Extracting Seed from Cones, by Raymond C. Rietz. For. Serv., U. S. Dept. of Agr. Supt. of Docs., Wash., D. C. Price 10 cents.

Volume and Taper Tables for Old-Growth Coastal Redwood, by William Hallin. Calif. For. and Range Exp. Sta., Berkeley, Calif.

Forest Resources of South Georgia, by M. M. Lehbras and I. F. Eldredge. Sou. For. Exp. Sta., Misc. Pub. 390 U. S. Dept. of Agri. Supt. of Docs., Wash., D. C. Price 20 cents.

Financing Fire Protection for Timber Lands Under Oregon Laws, by W. H. Dreese.1 and *Ranch Organization and Range Land Use in Coos and Curry Counties, Oregon*, by Harold R. Hochmuth and William W. Gorton. Agricultural Experiment Station, Corvallis, Oregon.

Nut Growers Meet

THE harvesting, marketing and cultural care of walnut featured the ninth annual field meeting of the Pennsylvania Nut Growers Association, held at Hershey on September 3.

Speaking on the subject of walnut orcharding, H. Gleason Mattoon of Philadelphia, president of the Association, told the conference of successful practices in growing grafted black walnut trees and of increasing demand for quality walnut kernels. He urged that more trees of improved strain be planted, concluding that "When fifty times the present orchard planting is in bearing, users will pay a higher price for walnut kernels."

L. V. Kline of the Tree Crop Unit, Tennessee Valley Authority, reviewed the TVA's five-year project in determining the possibility of walnuts as an economic factor in the Tennessee Valley. He told of test plantings of different select varieties at colleges and experiment stations and of small plantings by farmers to bring about a true cross section of walnut culture and the value of improved walnut varieties in southern land use.

Dr. J. Russell Smith revealed to the meeting his intensive program of adapting abandoned farms to tree crops in the Blue Ridge Mountains of Virginia. After a study of its performance in the South, this tree grower declared that the kudzu vine is being applied to orchard practice on his projects.

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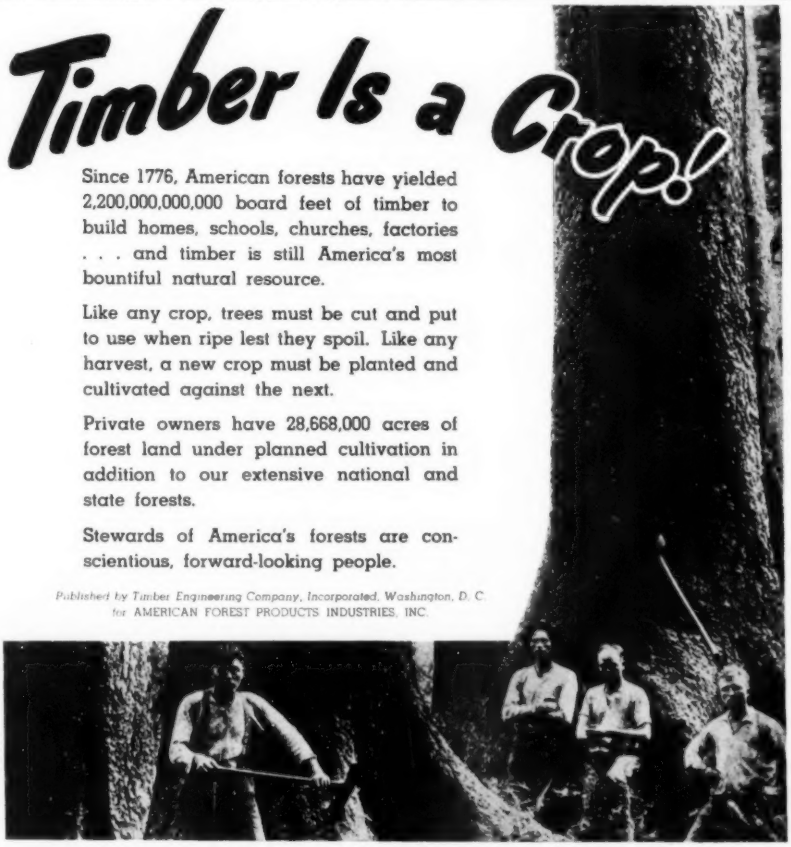

YOUR SHADE TREES:

By DEVEREUX BUTCHER
Photographs by the author

PLANNING FOR AUTUMN COLOR

OCTOBER is the time to plan for autumn color in your garden, on your lawn, or, if you are civic-minded, along your streets and in your parks. It is then that you can observe color effects and combinations at their best. Look around your immediate neighborhood, or drive out into the country. Red maples clumped around the borders of streams or ponds, yellow-leaved sassafras along the fence rows, the red of dogwood and the yellow of tulip trees banked against woodland borders, the deep red of the oaks—this is but a part of a colorful display nature stages for you in October. Observe carefully, discover color schemes and patterns best suited for your own garden, lawn, or street—then plan, and plant accordingly.

There are many kinds of native trees, as well as a few introduced species, which will brighten yard or landscape with their autumn leaves. By far the greatest variety are native to the eastern half of the country, but Rocky Mountain and Pacific Coast regions also have their autumn display. Some species, such as the dogwood, are highly desirable for planting in both East and West. And few trees contribute more to fall beauty than the dogwood.

The flowering dogwood, *Cornus florida*, of the East, and the Pacific or western dogwood, *Cornus nutallii*, of the far West, are eminently suited for this purpose. Both are small and particularly desirable for garden or lawn planting; the leaves of both turn bright red in the fall; both have large scarlet berries that are much sought after by birds. They like rich, well-drained soil, will tolerate shade, and do well when planted around the borders of groups of taller trees. The flowering dogwood has a natural range from southern Maine to central Florida, west to Texas, Kansas and Michigan, while the western tree grows along the coast ranges of Washington, Oregon and California.

Of the maples native to the East, the one most widely planted is the sugar maple, *Acer saccharum*, probably the finest of all our shade trees. It has a natural range extending from Maine west along the borders of the Great Lakes to Minnesota, south along the mountains to Georgia and through eastern Kansas to Texas. It grows best in upland soils, but is adapted to a wide variety of soil and climatic conditions. The leaves turn bright yellow or orange, and its only competitor for producng so large a head of brilliant yellow is the introduced Norway maple, *Acer platanoides*. Also native to eastern United States is the red or swamp maple, *Acer rubrum*, one of the best known for its fine coloration. Usually growing in moist sites when in the wild, it will tolerate a variety of soil and moisture conditions. In the open it develops a wide spreading crown, and though the foliage is not as dense as that of most other maples, it makes a good shade tree for the home. Sometimes the leaves of a single branch will turn brilliant red or yellow as early as August, with the rest of the leaves turning in September.

For western home owners, the vine maple, *Acer circinatum*, which also has bright red or yellow autumn foliage, is very desirable. Native to the forests of western Washington and Oregon, south as far as Mendocino County, California, this tree under normal conditions has a slender, sprawling trunk, but under cultivation assumes an upright, shrub-like form. Because of its delicately graceful foliage, the tree should be given far wider cultivation within its range, for it is now only rarely used as an ornamental.

The bigleaf maple, *Acer macrophyllum*, also found in Washington, Oregon and California, is widely planted as a shade tree, and though less brilliant in autumn than most maples, its large crown of dense foliage turns a deep reddish brown, adding big masses of color to the scene.

Easterners would do well to consider the tulip tree, *Liriodendron tulipifera*. It is a rapid grower and, under good conditions, attains a large size. Though its leaves fall soon after coloring, the bright yellow foliage which, in older trees, towers up in irregular masses, adds much to the landscape. Tulip has a natural range extending from Pennsylvania, Ohio and Indiana southward, but will grow beyond its northern limits, and is adapted to a fairly wide range of soil and moisture conditions.

As a group, the hickories, too, have bright yellow autumn coloration, and one or more species is native to all parts of eastern United States. They are difficult to transplant because of a tap root, but several of them, particularly the pecan hickory, offer the added attraction of a crop of edible nuts. To own one of these trees is well worth the effort of transplanting.

With red leaves and scarlet berries, the dogwood is a favorite in autumn color displays

Among the oaks there are three worthy of consideration for autumn effects. Scarlet oak, *Quercus coccinea*, has the most brilliant autumn foliage and takes its common name from its fall color. The leaves usually hang on well into winter, and retain much of their original brilliance. Red oak, *Quercus rubra*, turns a deep red rather late in the season. This is a very large tree when mature, and is best suited to large estates. The pin oak, *Quercus palustris*, also turns red, and if planted in the open will develop drooping lower branches that sometimes touch the ground with their tips forming a solid crown from ground to top. Adapted to many soils, the oaks will do best if planted in early spring. Sizes under eight feet tall should be used.

Another of the smaller trees that lends itself well to planting on properties of an acre or less is the sassafras, *Sassafras variifolium*, the leaves of which turn a clear yellow in autumn. But at all seasons

this tree is decorative. The rich foliage of variegated leaves offers good shade in summer, and the form of trunk and limbs, particularly in older trees, has a decided picturesqueness that is characteristic of the species. In autumn, too, the tree bears blue berries held by red stems. These berries attract birds, and provide food for them during the fall migration.

Though the trembling aspen, *Populus tremuloides*, is usually thought of as a truly wilderness species, it produces such a brilliant autumn effect that it deserves mention here. Across the northern part of the country and southward along the mountains, particularly in the Rocky Mountain states such as Colorado, it covers hills and mountain sides often to the exclusion of all other trees so that in the fall the landscape becomes almost an unbroken sea of blazing yellow. A small tree of cool climates, trembling aspen, though not widely used for ornamental purposes, has excellent possibilities if planted in the open within its natural range. In winter its gray-green trunk, and in summer its pale green leaves that flutter in the softest breeze are further qualifications.

Three sassafras trees on a small front lawn brighten the scene with their yellow autumn foliage

Another tree of clear yellow autumn foliage is the ginkgo, *Ginkgo biloba*. This tree was originally brought from China, but it is adapted to all but the arid parts of the United States. Though it does not offer an abundance of shade in summer, its strange form and oddly shaped leaves make it an interesting ornamental.

Within their ranges, two of the most spectacular trees in autumn are the sweet gum, *Liquidambar styraciflua*, and the black gum, *Nyssa silvatica*, both native to eastern United States. The sweet gum turns brilliant red with a tinge of orange or yellow, and is a medium-sized tree ideal for home planting. Its range does not extend north beyond southwestern Connecticut, but reaches west to Missouri and south to Florida and Texas. It does best in moist sites. The range of black gum extends north as far as southern Maine and southward through much the same area as the latter. Leaves of this tree sometimes turn during August, but the entire crown does not color until later in the season. The particular shade of red which the leaves of black gum take on is perhaps the most intense color to be found in any North American foliage. This tree along wind-swept coastal regions develops a characteristic form with the top picturesquely flattened and the branches arranged in horizontal layers. Inland the tree is taller and usually has a spreading, rounded crown. For use in suitable sites, the planting of these two handsome gums cannot be too highly recommended.

These are but a few suggestions. Look around and see the variety which nature has to offer, and you will surely find that there are opportunities for greater beautification of your property.

There is no all-inclusive rule for the most satisfactory time of year to plant trees. We are concerned here with deciduous trees exclusively, and in general it may be said that it is advisable to plant those with fleshy roots such as the dogwood and the tulip tree in the spring, while other trees can be moved in the fall unless exceptionally prolonged dry weather prevails. Winter planting in the South is possible, but in the North it is usually difficult because of frost. It is important to keep in mind that the tree chosen for planting must be suited to its new habitat with respect to soil, moisture and climate. Consult your local nurseryman about your own particular conditions.

TREES OF THE DISTRICT OF COLUMBIA — How to Know Them — Where to See Them
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Tree Crops for the Tennessee Valley

(*Continued from page* 482)

during three growing seasons, and after the fourth season, rapid growth was maintained by the phosphated trees, whereas the other trees were practically stagnant.

On many areas where locust growth is satisfactory, improvement of soil fertility is rapid and often accompanied by stands of desirable forage plants. After such locust plantations reach an age of from five to eight years, cattle may be turned in for short periods to help break down weeds and briars, stir the litter, and hasten seeding of the area. Gradual cropping of the trees for posts reduces the tree canopy and converts the area into a pasture containing widely-spaced locust trees which provide shade for cattle, protect against erosion, and produce a substantial amount of post material. Thus on certain soils, an eroding unproductive area can be made to produce a crop of locust timber while the soil is becoming more fertile, and when the timber is thinned or removed, a protective sod of forage plants remains. Some sites not so well adapted to locust can be made to support good growth by the addition of phosphate fertilizers.

The question then arises whether the benefits of soil improvement and pasture development associated with the use of locust trees can be extended to sites not naturally adapted to locust through the addition of phosphate and possibly lime. To answer this question it becomes necessary to deal individually with each of the soil series involved. Consequently, arrangements are being developed with the agricultural colleges of the states concerned to establish field tests under actual farm conditions. Eight separate farms are selected on each soil series for the establishment of the tests. To date, such tests have been started on five soils in Georgia and two soils in Alabama. It is expected that the results will apply to similar soils in other states.

Locust trees used for conservation work are grown almost entirely from seed. As such, they represent the average of the tree types native to the region where the seed was collected. There is reason to believe that by careful selection, more desirable types of trees, such as the "Shipmast" locust described by Oran Raber and the "Higbie" locust reported in southern Indiana by the Central States Forest Experiment Station, may be grown. If such superior types of locust could be produced in the nurseries cheaply enough for use in reforestation and erosion control planting, and if they grow successfully in the Valley, they might prove to be much more valuable than seedling stock. Work along these lines was started in 1936, and the first field test plantings of select locust types were made in 1941.

In selecting and collecting the plant materials, single tree or clonal selections have been made. In this work close contact has been maintained with the Hillculture Research Division of the Soil Conservation Service, which is conducting an extensive study of locust types throughout the range of the tree. By making joint collecting trips and by the exchange of plants, a number of superior types have been secured for use in the Tennessee Valley. They were propagated in the forest tree crop nursery in sufficient numbers so that during the past planting season about 100 test plots of three of the most promising types were established in a wide distribution over the Valley. These plots, and others to be established in the future, will afford a direct comparison of the performance of the selections against common seedlings.

What the eventual value of superior locust types may be is difficult to estimate. A number of questions must be answered before the general use of such planting stock can be recommended. The important question, however, is whether the added cost of using select locust can be reduced to a point where it is more than offset by the added value of the products.

A species often mentioned as a crop tree is the honey locust. The fruit of this tree is a large pod, often up to fourteen inches long, one and a half inches wide, and one quarter inch thick, containing a sweet pulp. It is fairly well known that the pods are eaten by cattle and a few authentic cases are on record of their use in cattle rations with apparently satisfactory results. It has been suggested that these pods would make a good supple-

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mental fodder for livestock and that the trees could be grown on steep, rough lands. The possibilities of such uses for honey locust were judged sufficiently promising to warrant investigation. The first steps were taken with efforts to locate outstanding trees in regard to the production of nutritious pods. This was followed by chemical analyses of food value, feeding experiments, pasture-use experiments, and certain minor studies relating to propagation and crop production of the species.

If pods of sufficiently high quality can be produced for forage purposes, then the use of the tree on certain types of pasture as a shade and forage tree seems to have possibilities. Several experimental plantations have been established to test these values. One experiment was set up at Blacksburg, Virginia, in cooperation with the Virginia Agricultural Experiment Station and one at Raleigh, North Carolina, in cooperation with the North Carolina Agricultural Experiment Station. Since these tests have been established very recently, final results cannot be expected for several years.

While the tests on the value of honey locust as a pasture shade tree are in progress, and the search for higher grade pods continues, certain experimental work on the propagation of the species is being conducted. Honey locust varieties can easily be propagated by grafting, and preliminary trials indicate that very inexpensive propagation by root cuttings may be feasible.

Most honey locust trees possess thorny trunks and branches; in fact, several trees producing the better grade pods are extremely thorny. Since the presence of thorns causes the tree to be despised by many farmers, the elimination of thorns is a desirable step toward its acceptance as a pasture shade tree. The propagation of thornless trees by grafting has been attempted and a successful method developed. It was found that by the careful selection of scionwood for the initial propagation, a thornless variety can be produced from a very thorny parent tree.

In summarizing the present status of the investigation with honey locust, it may be well to repeat that studies are still in progress which are expected to give further information on the ultimate value of the trees as a producer of forage. However, it seems improbable that the pod can be recommended for weight-building rations where a high concentration of food material is required. In practical cattle feeding the use of honey locust in maintenance rather than fattening appears more feasible, since the ripening of the pod coincides with the end of productive pasturage and the beginning of the winter carry-over of the stock.

Canada's Forests Fight for Democracy

(*Continued from page* 483)

centers across Canada are expanding as more thousands of pilots are being trained to man bombers. Timber officials are proud of the development in these important training centers of all-wood hangars.

Speeded defense activities in the United States have resulted, say Canadian officials, in an enormously increased importation of Canadian softwoods. Eastern Canada's birch peeler logs are in ever increasing demand for airplane construction in Canada, Great Britain and the United States. About 100,000 tons of birch peeler logs will be produced this year, and approximately thirty-five per cent will be exported. Canada's airplane spruce industry has also spurted as Dominion airplane plants increase production.

Expansion of these eastern Canada timber industries is the major change of policy anticipated in the immediate future by the Timber Controller.

Lumber shipping to Britain has been affected by the Battle of the Atlantic. Numerous ships have been sunk. A ship can make three trips from an eastern Canadian port while making one from a western Canadian port via the Panama Canal. Consequently, about 500,000,000 board feet of lumber has been railed across Canada from British Columbia in recent months for East Coast shipments to Britain.

Britain's lumber supply has been further expedited by the sending of 4,500 Canadian lumberjacks to the British Isles, where they are producing 2,500,000 board feet of lumber a week, with a 1941 goal of 600,000,000 board feet.

You can judge the spirit of Canadians by a story recently related by a Canadian newspaper. Workmen cleaning rubble from Nazi-bombed Houses of Parlia-

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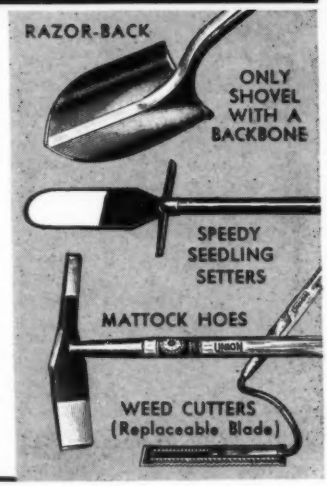

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ment in London found markings showing that oaken timbers were 700 years old. Authorities discovered that the estate from which they were cut seven centuries ago still stands, with more sturdy oaks ready to replace the shattered ones as the structure is rebuilt.

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That is the way of men; it is the way of forests.

A Pioneer Passes

(*Continued from page* 479)

him the outstanding pioneer in the culture of the tung oil in America."

By 1912, the Raynes tree was bearing fruit and its seed were used by Dr. Tennant Ronalds, also of Tallahassee, to plant a four-acre grove which was to be the first bearing grove in America. The next year, a bushel of nuts from the Raynes tree was given to the Paint Manufacturers Association of the United States and from it slightly more than two gallons of oil, the first processed in America, were secured.

Tung oil groves are now to be found throughout the Gulf States. In the vicinity of Gainesville, Florida, there are more than 4,000 acres planted to groves and a processing plant, the first in America, has been established.

William H. Raynes, sponsor and guardian of the Raynes tree, has long since passed to his reward, and his property has fallen into other hands. Designated by an enamelled plaque as the leased property of the United States Department of Agriculture, and protected from livestock by a special iron fence, the celebrated tree faded into quiet retirement, blessed by a kindly Mother Nature but forgotten by the mankind that it served.

Even the federal agency that initiated its existence abandoned it in 1933 by allowing the lease to lapse "when economy measures were being put into effect quite intensively." And another federal agency, within the past few months, has doomed it to an untimely and unnecessary death. The Raynes tung oil tree stood squarely in the right-of-way of a road-building project. Telephone poles, similarly situated, were left undisturbed, to be moved in due time. The old tung tree, thanks to its fence and government label, was spared destruction but, in midsummer and full leaf, it was butchered back to its main stems, moved approximately thirty feet, watered for a couple of days, and left to the tender mercies of a six-weeks' drought.

There is still evidence of life in the inner bark close to the ground and on the under side of its leaning trunk, but the pending winter will leave a dead tree. A great pioneer is passing to its reward.

"Boys' Conservation School" in Mississippi

THE "Boys' Conservation School" of Mississippi has completed its first year of operation under the supervision of the Mississippi Forestry and Chemurgic Association, in cooperation with various agencies of the state and civic and business organizations interested in conserving natural resources. Two of these camp-schools, each lasting six days, were held this summer.

This project, part of a cooperative, unified program of conservation to supplement and strengthen the work now being done by existing educational agencies, is designed to offer educational advantages to the youth of the state along conservation lines; to arouse a sense of responsibility on the part of adult leaders and civic organizations; to assist educators, teachers and county agents to carry on an expanded program in conservation; and, through publicity, to arouse public interest to the real need for a conservation program.

To put these policies into practice, boys throughout the state were encouraged to enter county contests to win scholarships to "Boys' Conservation School." Three scholarships were offered to each county and the selection of boys was made on the basis of regularly assigned and specialized work in conservation. In each county one 4-H Club boy was selected for his outstanding record by the county agent; one Future Farmer of America boy was selected by the vocational teacher; and one boy was selected from the county at large by the County Superintendent of Education. Civic and business clubs were called upon to sponsor these boys by defraying their expenses to the camp-school.

For convenience in operating these schools, the state has been divided into two sections and two "Boys' Conservation Schools" were held. The first was at Natchez Trace Park, near Houston, from June 9 to 14, for the north Mississippi group. The second was held at Percy Quin State Park, near McComb, from August 4 to 9, for the south Mississippi group. A full week of conservation training was given. One hundred and forty boys, representing fifty-six counties, attended the two schools.

FIGHT FOREST FIRES WITH POSTERS

Members and friends of the Association are familiar with the Forest Fire Prevention Poster Stamp pictured above. Sold in sheets of 100 at $1 a sheet, these stamps are now being widely used throughout the Nation. Used on letters, postcards, and packages they provide a quick and effective means of reaching large numbers of people with an important fire prevention message.

Because of the expressed interest of State Foresters, private organizations, and individuals concerned with fire protection, the Association has made available this same *4-color design* in a large size poster—measuring 13½" x 20". Lithographed on 80 lb. offset paper, a white strip is provided at the bottom for imprinting the name of the organization or individual purchasing them. The Association can arrange for this special printing at slight extra cost depending on quantity ordered or it can be done by your local printer. However the posters are complete without such printing.

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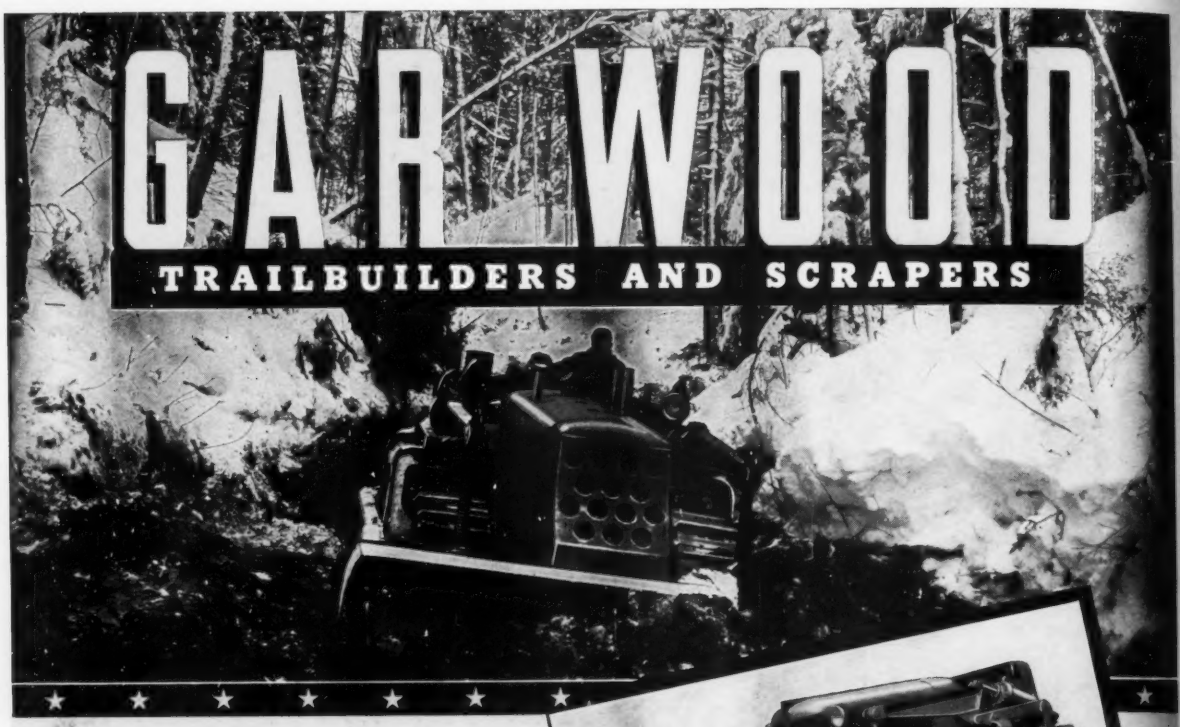

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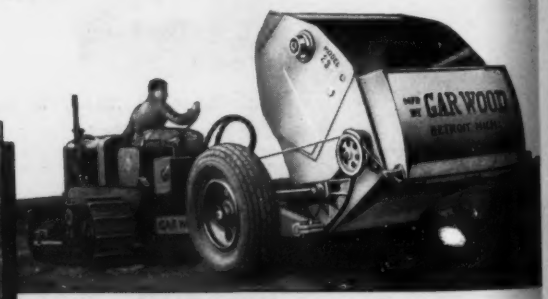

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